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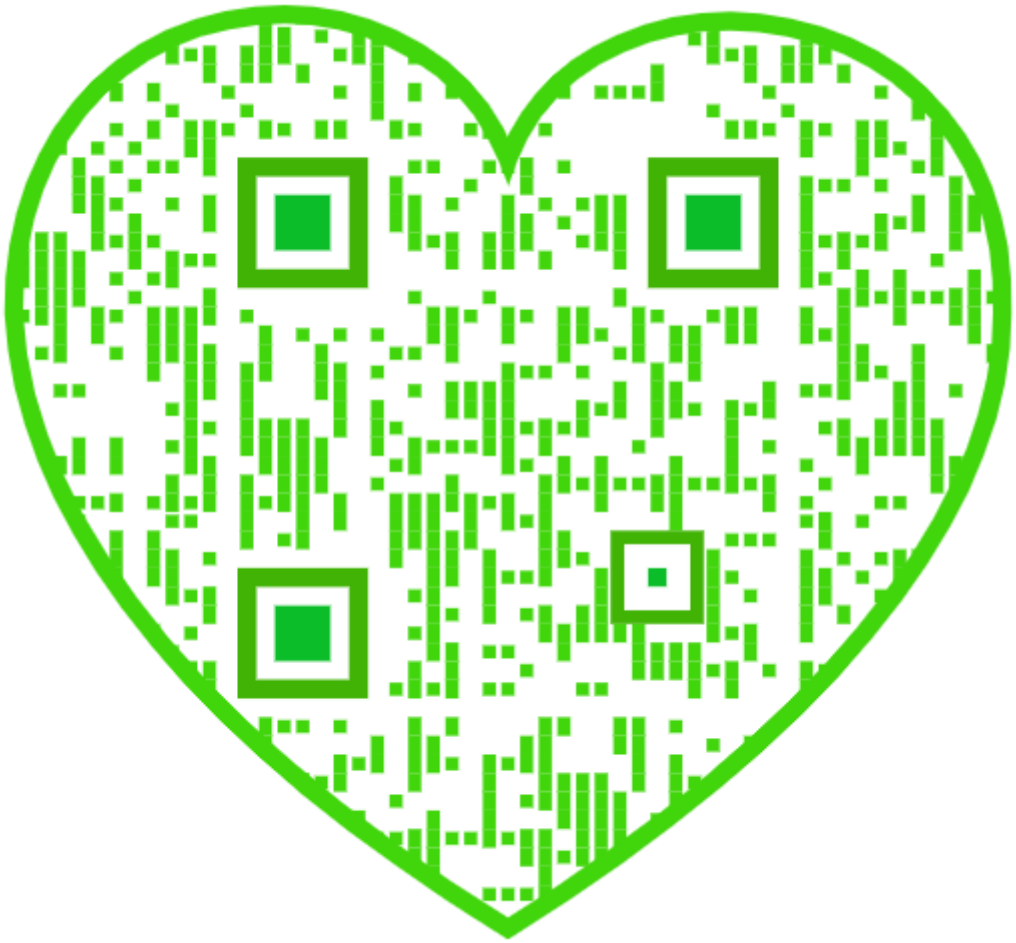

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UNITED STATES OF AMERICA.

THE

LUMBERMAN'S

HAND BOOK

OF

INSPECTION AND GRADING.

NEW EDITION 1889.

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LUMBER INSPECTION.

One of the most difficult tasks in the domain of lumber literature is the putting upon paper of a description of those various divisions or grades which are found to prevail in different localities. Surveying, as it is known in Maine and some other localities, Inspection, as it is termed in Albany and the West, consists of fixing a value to each individual piece of lumber. Inasmuch as no two are exactly alike, it is impossible to establish an arbitrary rule for the guidance of the Inspector, and as a consequence, the individual judgment must determine the value of each, from a consideration of its general character, and the uses to which it can be put in house building or manufacture.

As the judgment of men varies as much as each piece of lumber from its fellow, it becomes very difficult for one to see the value and character of a board exactly as it is seen by all others, and hence it is well nigh impossible to prescribe what shall constitute a board of any particular grade. If it be perfect in all other respects, it may not be of equal value with another equally, but no more, perfect board, in that it is of a more glassy, brash and tough texture, less straight and free in grain, and wholy unfit for the finer uses to which its fellow may be well suited. All these and many other considerations enter into the proper and judicious assorting and valuing of lumber, and must be determined according to the judgment and experience of the Inspector.

But while no arbitrary rule can be established, it was determined early in the history of the trade, that one could be applied to the general characteristics of lumber, which would guide both the buyer and seller in determining the value of a given piece. While these general characteristics applied to the distributions between the manufacturer and the consumer in the infancy of the trade, while but a comparatively small quantity was produced and consumption kept pace with production, when the demand increased and it was found necessary to build mills in the forest at a distance from the consumer, middlemen became necessary, and at various points in the country immense depots were established, to which the mill product could be shipped, and whence it could be distributed. But the still increasing population moving further and further from the points of

supply, necessitated another set of distributors, and the first began to confine their trade to selling, at wholesale, to the latter as retailers.

Now, the rules that had guided the mill-man in selling to his customers, required modification, and to prevent too great an advance in price, the retailer was compelled to obtain his compensation through a division into grades, and this system of grading has advanced to its present status, which may be almost classed among the fine arts, yet marked by as great a variance as there are individual judgments to determine it.

It is the purpose of this work to endeavor to point out the general laws governing the inspection of lumber, without expecting to wholly harmonize the ever conflicting opinions of the grand army of knights of the board rule. If, however, it succeeds in establishing a more generally uniform system of Inspection and yard-grading, the effort may well be called successful.

Albany, N. Y., after Bangor, Me., and Port Deposit, Pa., early became the most important center of the lumber trade of the country, and promulgated a system of Inspection, or sorting into qualities, which soon superceded the early rule of Surveying, which was simply straight measure, or the determining of the number of feet, regardless of quality. In this connection it may properly be said, that in the early days of lumber manufacture, it was the aim and custom of the producer to cut only the better class of trees, and it is within the memory of the writer, when the grades now known as Selects, Fine Common, or Picks, was the poorest which found its way to market as Common, and that which now comprises the bulk of the lumber handled, was considered as only fit to be sold at the mill, and such of it as by accident found its way to market was sold for what it would bring, often not realizing the cost of transportation. The growth of the trade, however, soon admonished the manufacturer that he must be more conservative with his timber, and the shipments and sale of Coarse Common, which included all between the present grade of Selects and Culls, was undertaken.

The fast depleting forests and the increased consumption throughout the country, especially of the lower grades, soon demonstrated that consumers were utilizing the cheaper product for cutting-up lumber, and that doors, sash and other building material could be made equally well from this grade as from the higher priced qualities. Albany now began to select out the nicer Common below the Fine Common grade, and Pickings became a favorite in that district.

If the wholesaler could make Pickings out of the Common, the retailer, equally fertile in resources, could make other qualities, and so subdivisions, such as A and B Selects, B Box, B Stock, 8-inch Flooring, and a hundred other designations came in vogue. These are one and all but sub-divisions of the old and well-known Albany grades, Clear, Fourths,

Box, Common, and Culls, more particularly of the Common. The designations given are uniform, but as before remarked, the selection varies widely, and an A Select in one yard may be bought as a Third Clear, or A Box, or even as a B Box in another.

The various systems of Inspection, Grading and Measurement are given in the following pages in about the order of their adoption in the different localities. It is more than probable that if any one standard of yard-grading is adopted universally at wholesale centers, it will be something very similar to that in vogue in Chicago, as it is believed to come nearest to meeting the general want of any method now in use. Markets competing directly with Chicago have aimed to grade as near like it as possible, and if this little work affords any aid in this direction, it will be a source of very great satisfaction to the publishers.

ALBANY INSPECTION.

This was originally divided into five qualities, viz.: Clear, Fourths, Box or Selects, Common and Culls. Clear, or Three Uppers, was sub-divided into three grades: First, Second and Third.

First Grade.—A First Clear board shall be perfect in all respects, free from wane, knot, rot, shake or check, not less than twelve feet long and eight inches wide, (in any case) unless a very wide and thick piece, when a minimum length of ten feet may be allowed.

Second Grade.—Not less than twelve feet in length, unless very wide and thick, with not more than two defects, *i. e.*, two sound knots which could be covered by a York shilling (dime), or sap equal to one inch on one side, or one knot and one sap; not less than ten inches wide, well manufactured, and free from rot, shake or check.

Third Grade.—Not less than twelve feet long, unless very wide and thick, and ten inches wide, free from rot, shake or check, when three defects might be allowed; either three knots which a York shilling would cover, or two saps an inch wide, with one small knot. If very wide the defects might be allowed slightly to increase, but not so as to injure the general character of the piece. These three grades are included in one and designated Clear or Good.

Fourths.—Not less than twelve feet long and twelve inches wide, with not exceeding four defects at that width, viz.: if free from sap, four sound knots on the heart side, not larger than a dime; if free from knots, two saps which must not exceed two inches on each edge, and must be

bright. At the minimum width, one face must be perfect; with increasing width latitude may be allowed to the extent of the sap.

Select Box.*—Not less than twelve feet in length and eight inches in width in any case. Must, if narrow, have one perfect face, and may have small knots, not exceeding five, in a width of fourteen inches or more. Sap may meet on one end, for not more than one-fifth the length, or two saps may be allowed on sap side, but must have at least three inches of heart wood between; sap must be bright; must be free from rot, shake and checks.

Box or Common.—All sound lumber free from knots, shaky hearts, rot, shake and worm holes which is below the grades before named, shall be classed as Box or Common.

Pickings.—A grade of common which in its general character will dress one side clear, or has no great number of small knots, but is suitable for finishing lumber. (A good fine common, but indifferent select).

Culls.—Will not hold water, shaky, rotten, coarse knots, black and mouldy sap. If very rotten, embracing more than one-eighth of the board, it becomes a scoot, refuse or mill cull. Market culls must be good enough to make hog pens, board fences or roof boards.

Scoots, Refuse or Mill Culls.—Lumber that is not worth removing from the mill, and is fit only to be burned.

*In the early days of the trade, the grade Select was known as Box, while Sound Common was known as Merchantable.

MICHIGAN INSPECTION.

The Saginaw Valley became the most extensive producing section of the country from about the year 1850, it being in the hey-day of its prosperity from about 1860 to 1875, during which period its manufacturers approximated yearly shipments from six to eight hundred million feet, and sales were ostensibly governed by Albany Inspection. The grade was of superior quality, and the question of Inspection became an important one. In order to secure as nearly as possible a uniformity in this regard, the manufacturers in 1873 obtained the passage of an Act of the Legislature, establishing in each organized County or other sub-division of territory, Inspection Districts, each having an officer known as Inspector General, with Deputies and Sub-Inspectors to be appointed by him. The details of their law, which was subsequently repealed need not be given here, but the inspection presented by it, being somewhat,

in its governing principles, in force by reason of prevailing custom, will be of interest to lumbermen everywhere.

It will be observed that in the upper grades, especially First Clear, it is more liberal than Albany, wherefore it may be argued, that inasmuch as a large proportion of the better grades from Eastern Michigan find their way to Albany, and are subject to inspection there, the present custom at Albany conforms very nearly to the rules established in Michigan.

Allowance must be made for the fact that established usage in Saginaw does not fully conform to the law as written. In fact, under the operation of the law, it is presumable, upon good grounds, that it was never strictly adhered to. It is a noticeable fact in all markets, that Inspection varies largely with an advancing or declining market; it becomes more or less liberal in proportion to the demand and readiness of sale. This is one of the main difficulties in the way of prescribing Inspection rules which shall always govern in all localities. At the same time, it is manifestly unjust that a piece of lumber which will pass in a given grade under an advancing market, should rank in a lower grade in a duller market. Many Michigan Inspectors never took kindly to the law as it was written, and varied their Inspection to conform to their personal opinions and judgments, and since its repeal have continued to do so. The tendency of the law was to the side of leniency, favoring the seller rather than the buyer, and its repeal was presumably in accordance with public sentiment, as expressed by the trade at large. It is, however, the only written exposition ever given for the guidance of the trade, and as such it is appended.

Synopsis of the Michigan Inspection Law of 1873.

Sec. 3.—* * * * It shall be the duty of each Inspector General, Deputy and Sub-Inspector, in determining the quality and quantity of lumber inspected by him, to place the same in that class or quality as hereinafter defined, to which it approaches the nearest in description and value, at all times using the description of qualities contained in this act as the standard of comparison.

Sec. 9.—All merchantable White Pine lumber shall be classified as follows, for purposes of inspection: First Clear, Second Clear, Third Clear, Common and Shipping Culls; and boards six inches wide shall be known as Strips. Norway Pine shall be classified as Common and Shipping Culls, except as hereinafter provided.

Sec. 10.—First Clear lumber shall be not less than eight inches wide, twelve feet long and one inch thick, and at such width, and up to ten inches wide, shall be free from all imperfections. If the width is twelve inches, defects shall be allowed that will equal knots in the aggregate of one inch in diameter, or sap that will be equal to one and one-half inches on one surface. If the width is sixteen inches, defects shall be allowed

that will equal knots in the aggregate of two inches in diameter, or sap that will equal two inches on one surface. If the width is twenty inches, defects shall be allowed that will be equal to knots in the aggregate of two and a half inches in diameter, or sap that will be equal to three inches in width on one surface. The Inspector shall take particular notice and shall allow a due proportion of defects for all pieces of widths between or above the given standards; also shall allow additional defects as the lengths increase above twelve feet, in proportion to such increased dimensions. He shall also allow as follows in each of the three grades of clear lumber, viz.: For each additional half inch in thickness, additional defects in proportion that shall equal knots in the aggregate of one-quarter inch more in diameter, or sap that will be equal to one-quarter of an inch more in width. All pieces shall be well manufactured and of full thickness (all knots to be sound), and all sap to be free from black stain that is of such character that it cannot be removed by dressing, and no piece shall be allowed with more than one straight split, and that to be not over one-fifth the length of the piece, which shall be counted as one defect.

Second Clear.—Shall be not less than eight inches wide, twelve feet long and one inch thick, and at such width, and up to ten inches wide, defects shall be allowed that will be equal to knots in the aggregate, of three-quarters of an inch in diameter, or sap that will be equal to three-quarters of an inch in width on one surface. If the width is twelve inches, defects shall be allowed that will be equal to knots in the aggregate of one and a half inches in diameter, or sap that will be equal to three inches in width on the edges. If the width is sixteen inches, defects shall be allowed that will equal knots in the aggregate of two and a half inches in diameter, or sap that will be equal to four inches in width on the edges. If the width is twenty inches, defects shall be allowed that will be equal to knots in the aggregate of three inches in diameter, or sap that will be equal to five inches in width on the edges. A straight split shall be allowed in this quality as before provided in boards of the width of twelve inches or over, and be counted as one defect.

Third Clear.—Shall be not less than seven inches wide, twelve feet long, and one inch thick, and at such width, and up to ten inches, defects shall be allowed that will be equal in injury to a knot one and one-half inches in diameter, or sap that will be equal to one and one-half inches in width on the best side. If the width is twelve inches, defects shall be allowed that will be equal in injury to a knot of two and one-half inches in diameter, or sap that will be equal to two and one-half inches wide on the best side. If the width is sixteen inches, defects shall be allowed that will be equal in injury to a knot of four inches, or sap that shall be equal to four inches wide on the best side. If the width is twenty inches, defects may be allowed that will be equal in injury to a knot five inches

in diameter, or sap equal to six inches on the best side, but sap in no case to exceed one-half the surface on the poorest side. In this quality shall be included pieces ten feet long and not having more than their due proportion of defects; also all pieces six inches wide and more than one inch thick, with not more than two small, sound knots, or sap not more than one inch in width on one side.

First Clear Strips.—Shall be six inches wide, one inch thick, and not less than twelve feet in length, and free from all imperfections.

Second Clear Strips.—Shall be the length, width and thickness of First Clear, and may have two small, sound knots, or if no knots then sap equal to one inch in width on one edge of one side.

Third Clear Strips.—Shall be of the width and thickness of First Clear Strips, and may have three small, sound knots, with sap one inch on one side; but if no more than three small, sound knots, then sap equal to two inches on one side may be allowed; to be free from rot, shake or split. First and Second Norway Strips of full width and thickness, and First and Second Clear White Pine Strips, ten feet in length, also First and Second Clear Strips rejected on account of thickness, and not less than five inches wide, shall be classed in this quality.

Common Lumber.—Shall include all Boards, Planks, Scantling, Strips, Joist, Timber, and lumber not otherwise defined, which is not as good as Third Clear, but is generally of a sound character, well manufactured, of full thickness, and free from large, loose knots and bad shakes, that show on both sides of the piece. Scantling, Joist and Timber must be free from imperfections which so weaken the piece that it cannot be used for substantial building purposes. Scantling, Joist and Timber made from worm eaten logs, and pieces with a small streak of rot, when not so badly damaged as to render the same unfit for ordinary uses of common lumber, shall belong to this quality. One straight split shall be allowed, provided it does not exceed one-quarter the length of the piece. Pieces that have not more than two augur holes, which are placed near the end of the piece, shall be allowed in this quality, provided they are measured in lengths of even number of feet between said augur holes, and conform in all other respects to the requirements of this quality. No lumber under ten feet in length shall be considered as merchantable.

Shipping Culls.—Shall constitute the lowest grade of merchantable lumber, and shall include all lumber not as good as common, which can be used for ordinary purposes without waste of more than one-half.

Mill Culls.—Shall include all lumber not as good as Shipping Culls. A board or plank over twelve inches in width, of which one end shall be wider than the other, shall be measured at a point one-third its length from the narrow end, to determine its width, and all such boards or plank less than twelve inches in width shall be measured at the narrow end.

All lumber over ten feet, up to and including twenty feet, shall be measured in lengths of even number of feet, and all over twenty feet long, each additional foot shall be counted, unless otherwise agreed between buyer and seller. No fractional part of a square foot shall be counted except in the measurement of joist, scantling or timber.

Sec. 11.—Merchantable lumber may be measured and inspected in either of the three following classes, viz: The first class shall be an inspection of the lumber in the five qualities aforesaid.

The second class shall be an inspection of the lumber in three classes, of which the first, second and third class shall form one, which shall be denominated Uppers, and the other two shall be Common and Shipping Culls as aforesaid.

The third class of inspection shall be in one quality which shall include the five qualities first mentioned, and shall be denominated Straight Measure.

SAGINAW INSPECTION.

While the preceding chapter reproduces the enacted law which for three or four years prescribed what should be the rule of inspection in the state of Michigan, it is an undeniable fact that Saginaw was a law unto itself, and while ostensibly working under the provisions of the written law, the inspection of that section was in reality unchanged from preceding systems, to which customs the inspectors mainly adhere to-day.

The same designations of Good, or Uppers, Selects, Common and Culls are retained, or lumber is sold log run (mill culls out) as prescribed in the last section of the defunct law. The main difference between the old Michigan law and Saginaw Inspection proper, is in the former being more in favor of the seller, while the latter is in favor of the purchaser of lumber, and the difference is confined to the higher grades.

The difference may be noted as follows: In the three uppers the Albany rule is more nearly adhered to.

First Clear.—Is not less than eight inches in width, and is free from imperfections, the term Clear implying freedom from defects.

Second Clear.—Not less than eight inches in width, at which it must be so nearly perfect as to fall but a trifle short of First Clear. As the width increases, a larger range of defects may be allowed, so that at twelve inches wide, a piece may have two knots of one inch diameter, or two narrow saps on one side; at sixteen inches wide, especially if the piece is more than one inch thick, two knots may be allowed, or one knot and one sap not over one and one-half inches in width. At twenty inches in

width the two knots may be larger, or the saps may widen to one and one-half inches.

Third Clear.—Is supposed to admit of three defects, but up to ten inches, knots should not exceed three-quarters of an inch in diameter, or sap not exceed three-quarters of an inch on one side. With increasing width knots may increase to three in number, not exceeding in size one inch each, or sap equal to one and a half inches in width on two edges of one side; with narrower saps a small knot showing on the face side might be allowed; but as a rule the three upper grades demand one perfect face. As in all other markets, the inspector is supposed to exercise a wide range of judgment in the inspection of the three uppers. A plank two inches thick and thirty inches wide will admit of a more lenient judgment, as regards defects in size and number, than a piece of half that size or of one inch thick.

A piece of soft cork pine, of free grain and generally handsome appearance, must not be judged with equal harshness with a piece of glassy texture, tough grain and unfavorable appearance.

An experienced inspector will in all cases judge of a piece of lumber from the standpoint of the location of its defects, and the general utility of the piece. While not more than three defects should as a rule be included in the three upper grades, no one would deny that a wide plank with even five knots located near one side, or even some of these showing through to the face, but where perhaps four-fifths of the plank is "clear as a hound's tooth," is deserving of classification in this grade. In reality, the inspection of lumber in uppers consists in defining what constitutes Third Clear, as, in practice, First and Second Clear is ignored, and the number and character of the defects which may be passed in Third Clear, determines the character of the Three Uppers. But in Saginaw and some other markets the term "Good" is used in designating the upper grades, and purchases are sometimes made in "Good," "Selects," "Fine Common," Common and Culls; yet, unless these terms are specified, the quality "Good" in common use will include not only the Three Uppers, but as well the next grade below, or Selects.

Selects.—This term allows of four defects in a piece of lumber. Four knots the size of from a dime to a quarter of a dollar, according to the size of the piece, or two saps on one side which, twelve inches wide, should not exceed three inches in the aggregate, or embrace more than one-quarter the sap side, the heart side being the face. With increasing width the proportion of sap may increase, or with narrow saps, the face side may have some knots. The general description of this grade, however, is of a class of lumber which has defects, of such a character, as, while condemning it for the Three Uppers, yet mark it as suited for many or most uses to which the Three Uppers may be put; the fact that it is usually

combined under the term Good, with the Three Uppers, showing it to be more nearly allied to them than to the lower grades. The dividing grades between the Three Uppers and Common was originally known as Fourths and the designations were Good, Fourths, Common and Culls. When, however, it became incorporated with the Three Uppers, and was included in that designation (as it has practically become) the grade Selects which had hitherto classed with the Common, was admitted to the code, and consisted of what had hitherto been looked upon as raising the Common to a higher standard of excellence. A board twelve inches wide with a perfect heart side, and the bright sap covering half or more of the sap side, would be a Select.

Fine Common.—Also sometimes known as Select Common, or Select Box, or where the designation is thoroughly known, Box, is a grade of lumber suitable for finishing purposes, yet having too much sap on one side, or too many knots on the other, to admit its entry to the grade of Selects. Fine Common is usually taken from the lumber cut next to the outside of the log, sometimes known as sap boards, the general character of which is to give one face side, while the other is largely covered with sap, which, if properly piled so as to dry without mould, is adapted to a large proportion of the finer work where one side only is exposed to view. With this point in mind the inspector will allow knots in this grade proportioned to the size of the piece. If the sap is narrow the face may have one or two small knots, but, except in wide lumber, the rule is observed "one side a face." Pieces below eight inches in width are seldom accepted in this grade, and at that width the defect is in sap, which may embrace not more than one-third the sap side and must not run on to the face side; or a board of that width may have a good sap side, nearly if not wholly clear of knots, and with or two small knots on the heart side. In larger pieces a board or plank having too many defects for the grade of Selects, and yet approaching almost to the requirements of that grade, is included in the Fine Common. A board sixteen inches wide, one inch thick, with five knots the size of one inch, and no other defect, would be classed with Fine Common. The same piece at one and one-half or two inches thick would probably by most inspectors be classed as Selects. Shaky lumber is not admitted in this or the upper grades. Fine Common is substantially the same as Chicago B Selects.

Strips, First Clear.—Are six inches wide, and one inch thick, and free from all imperfections, and are known as clapboard or siding strips. The term siding strips should not be confounded with "Sidings" lumber cut from the side of a log, in distinction from the stock, or lumber cut from the square log.

Strips, Second Clear.—Approaches A Flooring, Chicago yard grading. Six inches wide, one inch thick, and may have two small, sound

knots, or if no knots, then sap equal to one inch in width on one edge of one side.

Strips, Third Clear.—Nearest to B Flooring, Chicago yard grading. Six inches wide, one inch thick, and may have three small, sound knots, and upon one side in addition, sap equal to two inches in width. All strips in these three grades must be free from rot, split or shake.

Norway Strips.—Answering to the description of First and Second Clear, and ten feet or more in length, are included in this grade when sold as Norway.

Strips, Flooring and Fencing.—Include all strips not as good as Third Clear, yet free from rot and split. Flooring strips must be of full thickness and width, except where a narrower width is desired, when they may be of the uniform width of three, four or five inches. All knots in Flooring strips must be of a sound character. Fencing strips include all coarse grade strips not good enough for Flooring, and above the grade of Culls, or strips not up to the standard thickness, and their inspection is less rigid than the other grades.

Common.—The term common includes all boards, plank, scantling, strips, joist, timber and lumber not otherwise defined, which does not come up to the standard of Select Box, but is of a generally sound character, well manufactured, of full thickness, and free from large, loose knots, and bad shakes. Scantling, joist and timber must be free from knots or imperfections which involve or weaken the piece for substantial building purposes. Worm holes and small rot streaks, in extent not materially to damage the piece for the uses in which its size is usually employed, belong to this quality. One straight split, not more than one quarter the length of the board, may be allowed. Auger holes (almost unknown in Saginaw) are to be excluded, by measuring in even feet between the holes. No lumber under ten feet in length is considered as merchantable in this or the better grades.

Shipping Culls.—Unsound knots, or knots which affect the strength of the piece, black or mouldy sap, unsound hearts, bad splits, badly sawed lumber in wedges or tarves (uneven edges), where the piece is yet available for coarse use, and all lumber not up to the grade of common, is included in this grade. Anything poorer than shipping culls is not recognized in any market.

Saginaw lumber is always manufactured in twelve, fourteen and sixteen feet lengths (with an exceptional log of other lengths) in all grades, except dimension stuff, where lengths are cut to suit the sizes demanded, but the sidings from such logs are usually cut off to the twelve, fourteen and sixteen foot standard.

The thicknesses of the Saginaw lumber, as usually cut, are one inch, one and a quarter, one and a half and two inches, but with some three inch

in coarse plank for road or paving purposes, or in extra nice stock, for thick uppers or deals. All lumber is manufactured in parallel widths, and many mills employ cut-off tables for reducing all lengths to uniformity.

The coarser grades are almost uniformly cut one inch thick, the better grades almost invariably in the one and one-half and two inch thicknesses.

CHICAGO CARGO INSPECTION.

Adopted by the Lumberman's Exchange.

This may be termed a modification of the combined Albany and Saginaw Inspections. It is observed in the sale of cargoes on the Chicago wholesale market.

Section 1.—First Clear or White Pine Lumber shall be not less than twelve inches in width, and no imperfections allowed unless fourteen inches wide or upwards; will then allow imperfections equal to sap, one inch on one side, extending the whole length of the piece, on pieces fourteen inches wide and well manufactured, but the face side must be perfect; as width increases, will allow larger imperfections in proportion to the width, but not imperfections enough to decrease the value below the above described piece.

Sec. 2.—Second Clear White Pine Lumber shall be not less than ten inches wide and perfect up to eleven inches in width; will then a low imperfections equal to sap one inch on one side of the whole length of the piece, if well manufactured; as width increases, will allow other and larger imperfections in proportion to the width, but not imperfections enough to decrease the value below the above described piece.

Sec. 3.—Third Clear White Pine Lumber shall be not less than nine inches in width, and perfect up to ten inches; will then allow imperfections equal to sap, one inch on one side of the whole length of the piece, if well manufactured. The imperfections of this quality shall not exceed 100 per cent over those allowed in Second Clear.

Sec. 4.—Select White Pine Lumber shall include all lumber poorer in quality than Third Clear, the imperfections of which shall not exceed 100 per cent over those allowed in Third Clear.

Sec. 5.—Clear White Pine Flooring shall be one inch thick, six inches wide, and no imperfections.

Sec. 6.—Second Clear White Pine Flooring shall be in thickness and width same as Clear Flooring, and will allow of one small knot or sap three-quarters of an inch on one side, with clear face.

Sec. 7.—Common White Pine Flooring shall be of the width and thick-

ness of First or Second Clear Flooring, and may have three small, sound knots, with sap one inch on one side, but if less than three knots, then sap equal to two inches on one side, and shall be free from rot, splits and shakes. Four inch flooring strips, equal in quality to First and Second Clear Flooring, shall be classed as Common six inch Flooring.

Sec. 8.—Common Pine Lumber includes all boards, plank, joists, scantling, timber, fencing, and four inch strips that are of generally sound character, well manufactured, and not included in the foregoing qualities. Boards and plank should be square-edged, full thickness, and have no large, loose knots or bad shakes. In wide boards, twelve inches and over, will allow a straight split one-sixth the length of the piece, when otherwise sound. Fencing should be of good, sound character—pieces that will not break easily, six inches wide and one inch thick. Scantling, joist and timber should not have imperfections that would weaken the piece so that it cannot be used for substantial building purposes, and be uniform in width and thickness. Lumber should be measured at the small end, and if much wane on the piece, reasonable allowance made for it. Norway Pine Lumber shall be classed as common lumber, unless otherwise agreed upon. Cargoes of piece stuff or timber containing over twenty-five per cent Norway, shall not be considered standard, and all edge boards and inch lumber in cargoes of piece stuff shall be subject to special agreement.

Sec. 9.—All badly stained white pine lumber, that is otherwise better than Common, shall be inspected into a lower grade than when bright and free from stain.

Sec. 10.—All lumber described in the foregoing rules of Inspection shall be not less than one inch in thickness, and not less than twelve feet long.

Sec. 11.—Culls. A quality that cannot be received into any of the foregoing, consisting of even lengths, of ten feet and upwards, and so imperfect as to be unfit for ordinary uses without waste.

Mill Culls.—Refuse lumber.

Sec. 12.—All cargoes sold under straight measure shall consist of lumber twelve feet and over; and where, by imperfection of manufacture, such lumber is reduced in grade so as not to answer the purpose for which it was intended, it shall be measured at only one-half the amount in the piece for which it was intended. And all pieces containing auger holes, if fourteen feet in length and over, and bored only at the ends, shall be measured in full, excluding two feet in length of the piece; if bored in the center, it shall be measured for only one-half the amount in the piece. All lumber less than twelve feet to be subject for special contract between the parties. Mill Culls excluded in all cases. All boards and strips to be at least one inch thick; joists or scantling two or three inches thick.

Sec. 13.—Lath—Number One—should be four feet (no more, or less), in length; not less than three-eighths of an inch thick, and one and one-half inches wide, free from shakes, rot, wane, or worm-holes.

Number Two—same length as No. 1, may be less than three-eighths of an inch thick, and must be not less than one and one-quarter inches wide, will admit of wane and worm-holes not to exceed ten pieces in a bundle of one hundred.

Culls.—All that will not pass in the above named qualities.

Shingles.—All pine and cedar shingles shall be not less than sixteen inches in length, and three-eighths inch thick at the butt, and shall be classed and known as follows:

The first grade is to be denominated Clear, and to consist of shingles not less than three inches in width, all to be absolutely perfect.

The second grade is to be denominated Extra A, and this shall consist of shingles not less than three inches wide, and with the butts clear for ten inches of the length.

The third grade to be denominated Standard A, and to be not less than eight inches clear from the butt, and not less than three inches wide.

The fourth grade to be denominated Shaded A, the shingles to be clear for a distance of not less than five inches from the butt.

The fifth grade to be denominated No. 1, and to include everything poorer than Shaded A, but to be made of sound timber, with no unsound knots in the butt.

Culls.—Are a quality manufactured from winding, worm-eaten, shaky or dry rot timber, badly manufactured or less than sixteen inches in length.

It is recommended that one-quarter thousand bunches be packed in bands twenty inches in length, with twenty-five courses; one-half thousand bunches in twenty-five inch bands with forty courses. Shingles shall always be full count, and pay shall be collected only for the number of shingles actually delivered, regardless of the pretended number contained in each package or bundle; or, in other words, there shall be exacted in every instance for one thousand shingles, the equivalent of one thousand pieces four inches wide.

These rules, for the grading of shingles, were adopted by the Lumberman's Exchange, April 12, 1880.

CHICAGO YARD GRADING.

The system of grades prevailing among the yards of Chicago, is a most difficult thing to describe, yet a general similarity of ideas is supposed to prevail among all dealers. We therefore endeavor to give the general laws governing their grading.

First Clear.—Shall be not less than twelve inches in width and twelve feet long (except that in some yards ten foot pieces are admitted in the upper grades, the majority adhering to the twelve foot standard), and with no imperfections unless the piece is fourteen inches or over in width; will then allow imperfections equal to sap one inch on one side, extending the whole length of the piece, but the face must be perfect. As the width increases, will allow larger imperfections in proportion to the width.

Second Clear.—Shall be not less than ten inches wide, and must be perfect up to eleven inches. Above eleven inches, imperfections may be allowed equal to sap one inch on one side of the whole length of the piece, if well manufactured. With increasing width will allow other and larger imperfections in proportion to the width, but not imperfections enough to decrease its value beyond the standard of a twelve inch piece of above description.

Third Clear.—Shall be not less than twelve inches in width (except as below), and perfect up to ten inches; will then allow imperfections equal to sap one inch on one side of the whole length of the piece, if well manufactured. This grade, however, is subject to modification in that while it is mainly the equivalent of Albany Thirds and Selects, it may generally be found to combine the grades of A Box, A Stock and eight-inch A, varying from standard inspection by allowing a minimum width of nine inches and a length of twelve feet. In yard grading, knots as big as a half dollar may be allowed in a fair sized piece, as to general location and effect upon the use of the board. Smaller knots, as high as five in number, or bright sap on each edge of one side, two inches in width. In narrow boards, one face must be nearly perfect except eight inch A, where the general rule applies, modified by the width. A Stocks usually refers to twelve inch, but may apply to ten inch Stocks when so specified.

B Box and A Stocks.—Usually range in price with Third Clear. Eight inch A, although of the same general quality, ranges from $3 to $5 lower in price. Ten inch Stocks in all grades usually range $2 below twelve inch.

A Select, B Stock, Eight Inch A and B.—These are all of about

one grade, and are taken from Third Clear and Selects, which may be called "line boards, between the two grades.

A Select.—Is properly a grade below, although some claim to make it equal to Third Clear. In this grade, some yards will allow shake, where the use and general value of the piece is not seriously impaired thereby. As a rule, however, no shake is admitted. Knots may be allowed according to size of board and location of knots, but seldom both knots and shake. Widths may run from eight inch upward. Sap may be allowed equal to two inches on one side of a nine inch piece, increasing with the width. The term "Box" is applied to all grades, where the width makes the lumber suitable for cornice and shelving, or wagon-box boards, from which latter the Chicago use of the term is derived. Sample boards may be described as follows: A board twelve feet long, twelve inches wide, had one knot the size of a dime, one cat-face knot, two saps on one side, of which one is narrow, running the whole length, the other three inches at one end, tapering out at four feet. Some call this a fair, others a good, A Select.

B Box.—Is thirteen inches wide and over. A board seventeen inches wide, sixteen feet long, with twelve medium knots; another sixteen inches wide, two saps of two inches each on one side, and ten small knots on the other, were seen in a pile of B Box, but were criticised by other graders.

B Stock.—Is usually twelve inch, but may include ten inch stocks. Eight inch B is of parallel width (seven and one-half to nine) up to grade, in proportion to width.

B Select.—In general character is a sap board; if narrow, one side may be well covered with sap, no knots on the face. Such a board may be from seven to ten inches. At ten to fourteen inches, some knots and less sap. This class makes good "one side" lumber for finishing boards, and in general, knots may be allowed of a character not to injure the board for finishing purposes or for cutting up. A sample board seven inches wide had bright nearly covering one side, the other a face. Another of thirteen inches had but four inches of meat on the sap side, the sap came through to the face, and there were two small knots on the face. Another of nine inches had sap covering one end for five feet, sap ran slightly on to the face of the board. B Selects on wider pieces may combine some considerable shake at the ends, if the center is good, or on center if the ends are good.

The sap in this grade should be judged in the matter of color by its surroundings. While a black sap is scarcely allowable, a simple discoloration will not condemn the piece if all other requisites are present. A piece of fair width with one clean face to work would admit of a blacker sap on the outside of cut. In this grade also may be admitted a class of soft wide lumber, with large or even loose knots, where the cuts between the

knots may give a large proportion of finishing lumber. Such lumber is often found where the rules of regular and strict inspection would condemn a piece to the grade of cull, yet where the piece is of especial value for cutting up. This grade is substantially the same as the Fine Common of the Saginaw Valley.

Common.—All good sound lumber, ten feet long and upwards, however knotty, if the knots are tight and sound and not coarse enough to weaken the board, are included in this grade. Also sap boards, when the sap is fairly bright. Boards free from rot and shake, which involve their usefulness, are common boards. Lumber which will make a water-tight roof is in all markets included in this grade. Splits or Checks, if straight and not of an extent or nature to materially injure the board, are generally allowable. Bad splits and checks, especially when not straight, will always condemn a board of any grade to a lower one, according to the effect upon its usefulness. The same is true of waney edges. The lumber must be of full standard thickness and well manufactured. Worm-holes may be permitted in this grade in number and character proportioned to the size of the piece, but as a rule, wormy lumber should be excluded as Culls. Custom has allowed common plank, measuring one and seven-eighths inch thick, to be measured as if full two inch. A few worm-holes are not objectionable in dimension stuff, unless enough in number to weaken the piece, or of a generally unsightly character.

C Box.—Is a grade of thirteen inches wide and over, with small sound knots.

D Box.—Is simply good, wide Common.

Neither of these last two pretend to any grading above Common, except that their widths adapt them to special uses.

Stock Boards.—A class of lumber sawed of a uniform width of ten, twelve and fourteen inches. It is graded the same as other lumber, but its uniformity marks it as of superior utility for ripping into flooring, siding etc., or for manufacturers requiring large quantities of certain widths for special work. The lower grades are mainly used as barn boards or for coarse sheathing, and other similar purposes.

Other Varieties.—Norway mixed with other lumber uniformly classes as common; but when in lots by itself, may be graded in a manner similar to white pine, the designation "Norway" indicating its distinctness from white pine.

Flooring, siding and ceiling are graded according to the general rules applying to wider lumber, modified to suit the decreased width, but are measured as the piece was in the rough.

First and Second Clear Strips and Siding.—No. 1 is perfect in thickness, width and quality. No. 2 will allow of a narrow, bright sap on one side, or one or two small sound knots. The two are usually combined.

A, or First Common.—If free from sap may have two or three small sound knots, or bright sap one-half or three-quarters inch.

B, or Second Common.—May have three or four medium size sound knots, or bright sap of one to one and a quarter inch.

C, or Third Common.—May have two to six medium knots, or two to three inches of sap, or both sap and knots to equal these.

Flooring, A or First.—Should have one face nearly clear, with but one or two small, sound knots; the other may have more knots or sap.

B, or Second.—May have two to four sound, medium knots, and bright sap equal to one or one and a quarter inches.

C, or Third.—Will allow of three to six small, sound knots, or one and a half to two inches bright sap.

Fencing Flooring.—Is good. common flooring from selected fencing, and may have a large number of small, sound knots, but the general character of the piece is such as to make a good floor, practically free from shake and loose knots.

Fencing, No. 1 or Common.—Sound knots, not to weaken the piece; may have considerable sap. No. 2: black sap, coarse knots, shaky or otherwise defective, yet not so as to prevent its use as coarse fencing. Four inch lumber of any grade should have one-third less imperfections than is allowed, on six-inch widths. Norway of the same general quality is scrutinized much more closely than white pine.

Deck Plank.—Is lumber suitable for decking for vessels, and is usually three, four, five and six inches wide, and three to four inches thick, and the greater the length the more valuable is it considered. No lot averaging under twenty-five to thirty feet in length is properly classed as decking. This should be almost wholly free from sap, must be free from shake, but may have any reasonable number of small, sound, red knots. It is sometimes used two and a half inches in thickness.

Culls.—Unsound lumber, loose knots, bad, black knots, or large, coarse knots, loose or shaky hearts, unedged or waney and badly shaky lumber, black sap stain, especially if mouldy. All wormy lumber, rotten streaks, or ends badly manufactured as to thickness, wedge boards or tarved lumber (thick on one edge and thin on the other), or boards which won't hold water. All the above properly belong in Culls, and when unfit to be used as roofing to nail shingles on, or is generally unsightly in appearance, it is known as "Scoots," Refuse, or Mill-Culls, and has no quotable value.

Lengths.—In some yards ten feet is the standard of length, and all lumber is measured in even figures of ten, twelve, fourteen, sixteen and eighteen feet; odd lengths are unknown unless in special orders and in lumber of over twenty feet. Until within the last two years twelve feet was the minimum of length in a merchantable piece of lumber, and most yards yet adhere to this rule. All lumber of less than ten feet is unsal-

able, except when in quantities, as it is often found in irregular lengths at gang saw-mills, when it is known as "clips." This is sometimes sorted as to quality, but has no classification; it is usually sold as a bulk, either by the pile or by straight measure, and is often of a desirable character for builders.

Widths and Thickness.—The wider a board is the more latitude is allowed for defects. This remark applies generally to lengths, widths and thickness, although as a rule, unless a board holds plump to an intended thickness, it is measured to the next standard below. In dimension, or bill stuff such as joist, scantling or timber, a variance in thickness is almost universally allowed by dealers and consumers, although strict rules of inspection demand full sizes in all respects.

In wholesale markets a board measuring a half inch or more over a certain width is measured at the next lower number. In retailing, however, the half inch is properly counted, while in some markets the "give and take" principle is observed; that is, if a full half inch or over, it is called at the next higher figure; if not full half inch it is called back to the last full figure.

The following table shows the average weights obtained in the actual shipment from Chicago of 20,000,000 feet of pine lumber, during an entire season:

	POUNDS.
1, 1¼ and 1½-inch, surfaced one side	2,102
The same, surfaced two sides	2,068
2-inch, surfaced one side	2,200
White pine flooring, dressed and matched	1,890
Hard pine flooring	2,366
Ship lap, 8-inch	1,711
Ship lap, 10 inch	1,725
Ship lap, 12-inch	1,855
White pine, ⅜-inch ceiling	786
Hard pine ⅜-inch ceiling	950
Siding	865
Piece stuff, rough	2,560
Piece stuff, surfaced one side and one edge	2,210
Thin clear, surfaced one side	1,380
⅝ ceiling	1,120
Rough boards	2,524
Hard pine fencing	2,910
4-inch flooring, dressed and matched	1,793
6-inch fencing	2,483
Pine shingles	248
Cedar shingles	203
Dry lath	507

CHICAGO HARDWOOD INSPECTION.

Revised Rules, Adopted by the Lumberman's Exchange, Jan. 22, 1889.

INSTRUCTIONS TO INSPECTORS.

INSPECTORS of lumber are not manufacturers and must measure and inspect lumber as they find it, of full length and width (except as to wane, which must be measured out or inspected in a lower grade), making no allowance for the purpose of raising grade unless so instructed by the buyer and seller.

In hardwood inspection the inspector is instructed to use his best judgment, based upon the rules for his guidance.

THE STANDARD KNOT shall not exceed 1¼ inches in diameter, and must be of a sound character.

SPLITS are always more or less damage to a piece of lumber. An allowance must be made, either in determining the quality or quantity, according to the nature of the split. A split extending to exceed one foot will reduce it to one grade lower.

All lumber should be sawed plump thickness. Thin lumber is not considered marketable, and must be reduced to the next standard thickness, or at least one grade lower on account of thinness.

A CULL which will not work one-half of its size without waste, is a mill-cull of no recognized value.

When lumber or timber does not come up to grade or contract, it must be placed in the next lower grade named.

Lumber sawed for specific purposes, such as axles, bolsters, tongues, reaches, newels, balusters, squares, etc., must be inspected with a view to the adaptability of the piece for the intended use, as, in many cases, it cannot be used for other purposes.

In inspecting the grade of firsts and seconds, an undue predominance of seconds should always be judiciously ascertained, as the purchaser is entitled to the full average in grade, which must not comprise more than 66⅔ per cent of seconds.

STANDARD LENGTHS are always recognized as being 12, 14 and 16 feet. Shorter than 12 and longer than 16 feet does not come within the range of standard. In black walnut and cherry an exception is made, and 10 feet is recognized as a standard length. Shorter or longer than standard lengths, in all varieties of hardwood lumber, except in counter tops, are to be reduced one grade lower, unless otherwise agreed between buyer and seller.

MIXED LOTS, containing boards, planks, flooring, bolsters, reaches, etc., shall be measured and inspected according to the rules governing the measurement and inspection of boards and planks, unless otherwise agreed between buyer and seller.

FLOORING STRIPS should be 4 and 6 inches in width; 1 and 1¼ inches in thickness. Other widths and thicknesses shall be designated as special sizes. It must have one face and two edges clear.

COMMON flooring strips shall be of the same size and general character as clear, but may have two small sound knots not exceeding three-fourths of an inch in diameter, or a small amount of wane on one edge which will not injure it for working to its full size.

HICKORY should never be cut while the sap is rising, as it is then liable to powder-post, and indications of deterioration of this character should be carefully scrutinized.

NEWELS from all kinds of timber must be clear and free from heart, to square 5, 6, 7, 8, 9 and 10 inches, plump. The length must be 4 feet full or multiples thereof.

BALUSTERS and table legs shall be clear and square, 2x2, 2½x2½, 3x3 and 4x4, 32 inches long.

NEWELS, balusters and table legs not coming up to the grade of clear shall be classed as cull.

COUNTER-TOPS shall be 12 feet and over long, 1, 1¼ and 1½ inches thick, and must be strictly clear, not less than 20 inches wide.

CLEAR lumber shall be 10 inches wide and over, free from all defects of every kind or nature.

BOLSTERS must be 4 feet, 4 feet 6 inches, or multiples thereof in length and the size must be 3x4, 3½x4½, 3½x5 or 4x5 inches.

REACHES must be 2x4, or 2¼x4½ inches, and the lengths 8, 10, 12 and 16 feet.

HARROW TIMBER must be 2½x2½ inches, and the lengths, 5, 10 and 14 feet.

HICKORY AXLES must be clear, and in lengths of 6 or 12 feet for sizes 3½x4½, 4x5, 4x6 and 4½x6 and 7 or 14 feet for 5x6 and 5x7 on special order, cut from sound, tough, butt logs.

WAGON TONGUES must be clear and straight, 2x4 at small end and 4x4 at the butt end, or 2½x4½ at small end and 4½x4½ at butt end, 12 feet long, from tough, straight-grained timber.

BOLSTERS, reaches, harrow timber, hickory axles and wagon tongues not up to the grade of clear will be classed as cull.

STANDARD THICKNESSES shall be 1, 1¼, 1½, 2, 2½, 3 and 4 inches, except poplar which will allow ⅝ inch.

When lumber is sold on this market to be measured merchantable, the inspector must measure full, except in culls which are to be measured at one-half.

It is important that all lumber should be parallel in width, square-edged, and with square ends. Tapering lumber should be measured at the small end. Ordinary season checks are not considered defects.

SQUARES shall be 4x4, 5x5, 6x6, 7x7 and 8x8 inches.

STAINS, SPECKS, hearts shakes, rot worm-holes, etc., are considered serious defects, reducing the lumber to grades lower than firsts and seconds.

LOG RUN is always understood to be the unpicked run of the logs —mill culls out.

POPLAR AND WHITEWOOD.

The inspection grades shall consist of firsts and seconds, common and cull.

FIRSTS AND SECONDS shall be 8 inches wide and over. At 11 inches may have 1 inch of sap or 1 standard knot and at 13 inches 2 standard knots or 3 inches of bright sap. At 15 inches 3 standard knots or 4 inches of bright sap may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

COMMON shall include 6 inches and over wide. At 6 inches one, and at 8 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width. Slightly discolored sap is no defect.

CULL shall comprise all widths and sizes below the description of common.

BOX BOARDS shall be 12, 14 and 16 feet long, from 13 to 17 inches wide and free from all defects except bright sap one-third of their width.

ASH.

The inspection grades shall consist of firsts and seconds, common and cull.

FIRSTS AND SECONDS must be 6 inches wide and over. At 8 inches one, and at 10 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width. Bright sap is no defect.

COMMON shall include 5 inches and over wide. At 6 inches one, and at 8 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

CULL shall comprise all widths and sizes below the description of common.

OAK.

The inspection grades shall consist of firsts and seconds, common and cull.

FIRSTS AND SECONDS must be 6 inches wide and over. At 8 inches one, and at 10 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

COMMON shall include 5 inches and over wide. At 6 inches one and at 8 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width. Thick plank may contain sound hearts if well boxed.

CULL shall comprise all widths and sizes below the description of common.

WAGON STOCK must be cut from good, sound, tough, straight-grained timber, free from knots.

TIMBERS must be free from unsound knots. Sound hearts not showing on the outside will be allowed.

HICKORY AND PECAN.

The inspection grades shall consist of firsts and seconds, common and cull.

FIRSTS AND SECONDS must be 6 inches wide and over. At 8 inches one, and at 10 inches two standard knots or bright sap may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

COMMON shall include 5 inches and over wide. At 6 inches one, and at 8 inches two standard knots may be allowed An allowance for more defects of this character may be made in proportion to increased width.

CULL shall comprise all widths and sizes below the description of common.

BLACK WALNUT.

The inspection grades shall consist of firsts and seconds, common and cull.

FIRSTS AND SECONDS must be 6 inches wide and over. At 8 inches one inch of sap or one standard knot, and at 10 inches two inches of

sap or two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

COMMON shall be 5 inches and over wide and shall include all lumber not up to the grade of firsts and seconds, but available full three-fourths of its size without waste, free from hearts and unsound lumber.

CULL shall comprise all widths and sizes below the description of common.

CHERRY.

The inspection grades shall consist of firsts and seconds, common and cull.

FIRSTS AND SECONDS must be 6 inches wide and over. At 8 inches may have one inch of sap or one standard knot, and at 10 inches two inches of sap or two standard knots. An allowance for more defects of this character may be made in proportion to increased width.

COMMON shall be 5 inches and over wide and shall include all lumber not up to the grade of firsts and seconds, but available full three-fourths of its size for use without waste, free from hearts and unsound lumber.

CULL shall comprise all widths and sizes below the description of common.

NOTE.—Gum spots are considered a serious defect, and when their damage exceeds one-sixth of the size of the piece, shall reduce to the grade of common. When their damage exceeds one-third of the size of the piece, it shall be reduced to cull.

BUTTERNUT AND CHESTNUT.

The inspection grades shall consist of firsts and seconds, common and cull.

FIRSTS AND SECONDS must be 6 inches wide and over. At 8 inches may have one inch of sap or one standard knot, and at 10 inches two inches of sap or two standard knots. An allowance for more defects of this character may be made in proportion to increased width.

COMMON shall be 5 inches and over wide. At 6 inches one inch of sap or one standard knot, and at 8 inches two inches of sap or two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

CULL shall comprise all widths and sizes below the description of common.

GUM.

The inspection grades shall consist of firsts and seconds, common and cull.

FIRSTS AND SECONDS must be 6 inches wide and over. At 8 inches one standard knot, and at 10 inches two standard knots or one inch of bright sap may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

COMMON shall include all lumber available for use full three-fourths of its size without waste, free from hearts and unsound lumber. Clear sap may be included in this grade.

CULL shall comprise all widths and sizes below the description of common.

HARD AND SOFT MAPLE.

The inspection grades shall consist of firsts and seconds, common and cull.

FIRSTS AND SECONDS must be 6 inches wide and over (except flooring). At 8 inches one and at 10 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

COMMON shall be sound, 5 inches and over in width, and may have defects not injuring it for ordinary use without waste. At 6 inches one and at 8 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

CULL shall comprise all widths and sizes below the description of common.

BASSWOOD AND COTTONWOOD.

The inspection grades shall consist of first and seconds, common and cull.

FIRSTS AND SECONDS must be 6 inches wide and over. At 8 inches one and at 10 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width. Bright sap is no defect.

COMMON shall include 5 inches and over wide. At 6 inches one and at 8 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width. Slightly discolored sap is allowed.

CULL shall comprise all widths and sizes below the description of common.

BIRCH.

The inspection grades shall consist of firsts and seconds, common and cull.

FIRSTS AND SECONDS must be 6 inches wide and over. At 8 inches, one and at 10 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width. Bright sap is not a defect.

COMMON shall be sound, 5 inches and over in width, and may have defects not injuring it for ordinary use without waste. At 6 inches one and at 8 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

CULL shall comprise all widths and sizes below the description of common.

BEECH AND SYCAMORE.

The inspection grades shall consist of firsts and seconds, common and cull.

FIRSTS AND SECONDS must be 6 inches wide and over. At 8 inches one and at 10 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

COMMON shall be sound, 5 inches and over wide, and may have defects not injuring it for ordinary use without waste. At 6 inches one and at 8 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

CULL shall comprise all widths and sizes below the description of common.

ELM.

The inspection of grades shall consist of firsts and seconds, common and cull.

FIRSTS AND SECONDS must be 6 inches wide and over. At 8 inches one and at 10 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width. Bright sap is not a defect.

COMMON shall include 5 inches and over wide. At 6 inches one and at 8 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

CULL shall comprise all widths and sizes below the description of common.

QUARTER-SAWED HARDWOOD LUMBER—OAK, SYCAMORE, ETC.

The inspection grades shall consist of firsts and seconds, common and cull.

FIRSTS AND SECONDS must be 5 inches wide and over. At 7 inches one and at 9 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

COMMON shall be 4 inches and over wide. At 6 inches one and at 8 inches two standard knots may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

CULL shall comprise all widths and sizes below the description of common.

CYPRESS.

The inspection grades shall consist of firsts and seconds, common and culls.

FIRSTS AND SECONDS must be 8 inches wide and over. At 10 inches two standard knots and 3 inches of bright sap may be allowed. An allowance for more defects of this character may be made in proportion to increased width.

COMMON shall include all lumber not up to the grade of firsts and seconds, but free from shakes, large knots, hearts and unsound lumber.

CULL shall comprise all widths and sizes below the description of common.

SHAKES AND PECKS are of great damage and should be closely scrutinized.

SOUTHERN OR YELLOW PINE.

Inspection grades shall consist of firsts and seconds, common and cull.

FIRSTS AND SECONDS must be 8 inches wide and over (except flooring), free from defects except narrow bright sap on the face side, or two small sound knots not over three-fourths of an inch in diameter.

COMMON shall include all lumber not up to the grade of firsts and seconds, but free from shakes, large knots or unsound lumber.

CULL shall comprise all widths and sizes below the description of common.

FIRST AND SECOND CLEAR FLOORING AND STRIPS must be free from all defects except bright sap, which is allowable. Blue sap is excluded.

COMMON FLOORING AND STRIPS must be of the same size and general character as first and second clear, but may have two or three

small sound knots of not more than three-fourths of an inch in diameter, or a small wane on one edge which will not injure it for working to its full size.

STEP PLANK, first and second clear, must not be less than 12 inches wide and 1½ and 2 inches thick; free from all defects on one side, except 2 inches of bright sap.

RED CEDAR.

Red cedar should be sold log run, to be measured for what it can be worked for. Lengths and widths are no defects. Caution should be used in determining defects.

NOTE.—Inspectors are authorized to measure and inspect all kinds of hardwood lumber that are not included in these rules according to the rules governing the inspection of hard and soft maple.

ST. LOUIS INSPECTION.

Adopted at a Meeting of the Trade held December 19, 1883; to take effect on and after January 15, 1884.

INSTRUCTIONS TO INSPECTORS AND MEASURERS.

It is understood that when the term strips is used, the said strips shall be six inches in width unless otherwise specified. All tapering pieces of lumber to be measured one-third ($\frac{1}{3}$) the distance from the narrow end, when 12 inches and over in width at the center, and when less than 12 inches wide in center to be measured at the narrow end. All lumber to be measured in even lengths (except culls), from 12 to 30 feet inclusive in length. Above that length timber shall be counted for what it will measure.

Culls commence 10 feet in length, and then measure the same as other qualities. Manufacture should be taken into consideration in all qualities, and if badly manufactured should reduce the grade. Pieces of lumber that have auger holes near the end, should be measured for length between the holes, if 12 feet and over, and what is so measured to be called in its proper quality; if any auger holes in the center, as well as at the ends, should go into cull to be measured full.

Inspectors and measurers are instructed that the rule herein given as to width and thickness, is the standard width and thickness for merchantable lumber of each grade. But when some slight deviation, either in width or thickness, should occur by accidental manufacture, so long as it will not hinder the lumber from being used for the purpose for which it is in-

tended such lumber shall not be reduced in grade on account of such deviation, it being the purpose of the accompanying rules of inspection to grade lumber so that the grades sold on the lumber market and out of yards shall be the same. In no case shall mill culls be considered a quality for the purpose of increasing the inspection fees.

RULES FOR THE INSPECTION OF HARDWOOD LUMBER.

In hardwood inspection, the inspector is instructed to use his best judgment, based upon the general rules laid down for his guidance. He must inspect all boards and plank on the poorest side, excepting in flooring. The standard knot is to be considered as not exceeding 1¼ inches in diameter, and of a sound character. Splits are always a greater or less damage to hardwood lumber, and will reduce a piece to one grade lower if the split is over 12 inches in length in boards and plank, or six inches in strips, but split must be straight and in one end only to be allowed. All hardwood lumber should be sawed 1-16 inch plump. All lumber must be sawed square edged, unless otherwise ordered, and boards and plank having bark or wane must be reduced one grade and measured inside wane or bark. All boards one inch and under thick shall be measured face measure. If sawed scant one inch shall be reduced one grade; if under three-fourths of an inch reduced two grades. All badly mis-sawed lumber shall be classed as culls. No cull is considered as having a marketable value which will not work one-half its size without waste. Lumber sawed for specific purposes, as axles, bolsters, reaches, harrow timbers, newels, balusters, etc., must be inspected with a view to the adaptability of the piece for the intended use, as in many cases it cannot be utilized for other purposes. In the inspection of combined grades of firsts and seconds, an undue predominance of seconds should always be judiciously ascertained, as the purchaser is entitled to the full average in quality, based upon the average mill run of the kind of timber involved. Standard lengths are always recognized as being 12, 14 and 16 feet, but 10 per cent. of 10 feet lengths may be allowed. Shorter than 10 feet does not come within the range of marketable, although sometimes admitted. In black walnut and cherry an exception is made, and 10 feet is recognized as a standard length, and 10 per cent. of eight foot lengths may be admitted in the firsts and seconds, and even six feet in lower grades. Mill culls are never recognized as marketable, and all culls which will not work to the use for which the timber or the size is applicable, without wasting more than one-half, is a mill cull, and shall be so reported on certificate.

Hickory should never be cut while the sap is rising, as it is then liable to powder-post, and indications of deterioration of this character should be carefully scrutinized by the inspector.

Newels from all kinds of timber must be cut outside the heart, to square 5, 6, 7, 8, 9 and 10 inches when seasoned; the lengths must be four feet or the multiples thereof.

Balusters must be cut exactly square—2x2, 2½x½, 3x3, and 4x4, Lengths must be 30 and 32 inches.

Black walnut counter tops must be 12, 14, 16 or 18 feet long, 1, 1¼, 1½ and 2 inches thick, and the width must not be less than 20 inches and free of defects.

Bolsters must be four feet eight inches or the multiple thereof in length, and the size must be 3x4, 3½x4½, and 4x5.

Reaches must be 2x4, and the lengths 8½, 9, 10 and 2½x4—12 feet.

Hickory axles must be in lengths of 6½ feet for sizes 3½x4½, and 7 feet for sizes 4x5, 4½x5½ and 5x6 on special order, all cut from tough butt logs.

Ash wagon tongues must be 2x4 at one end, 3½x4, or 4x4 at the other end, 12 feet long, and from tough timber.

Thicknesses shall be recognized at 1, 1¼, 1½, 2, 2½, 3, 3½, 4 and 5 inches in all classes of hardwood boards and plank.

Merchantable includes only sound lumber, free from rot, shake and unsound hearts; hearts in nearly all varieties of lumber are to be excluded from all grades above culls.

It is important that all lumber should be parallel in width, square-edged and with square ends.

In poplar or whitewood, marketable thicknesses shall be recognized at ⅝, 1, 1¼, 1½, 2, 2½, 3 and 4 inches; ½, ¾, 5 and 6 inches are classed as special sizes. When squared, the sizes shall be 4x4, 5x5, 6x6, 7x7, 8x8, 9x9 and 10x10, and should be sawed ⅛ inch plump.

Worm-holes are to be considered as one of the most serious defects in hardwood lumber.

POPLAR OR WHITEWOOD.

Inspection grades shall be known as Clear, Second Clear, Common and Culls.

Clear must be 10 inches or more in width, and free from all defects. The square pieces are exempt from this rule only as to width.

Second Clear must not be less than eight inches in width and clear up to 10 inches. Boards or plank 10 to 12 inches wide may have two standard knots, but no other defects; or may have bright sap not over three inches in width at any place or in the aggregate, and no other defects. Boards and plank over 14 inches wide may have two standard knots and four inches of bright sap. Boards and planks free of other defects may be one-half bright sap, if over 12 inches wide.

The two grades above enumerated may be combined in one grade, to be designated "Firsts and Seconds."

Common shall include any width not less than seven inches, and will allow of bright or discolored sap and knots beyond those described in Second Clear. Two unsound standard knots will be allowed in this grade, if over 12 inches wide, and splits shall not be considered a defect. Otherwise lumber must be sound.

Culls shall comprise all widths and sizes having more defects than described in Common, whether in the number or character of the knots,

badly checked, and generally such lumber as is unfit for ordinary purposes without waste.

Box boards shall be 12, 14 and 16 feet long, from 13 to 17 inches wide, free from all defects except, may be, one-half bright sap.

Poplar strips must be full six inches wide, 1 and 1½ inches thick, 12, 14 and 16 feet long. Clear shall be free of all defects. Second clear may be one-half bright sap on sap side, and have one sound knot not over ¾ inch diameter. Common shall embrace all sound strips with more defects than second clear. Cull shall contain all unsound strips that will work to one-half its contents and all tapering strips.

Chair plank must be sound and free of heart and large knots, and sawed full width and thickness as ordered.

WHITE ASH.

The inspection grades shall consist of Firsts and Seconds, Common and Culls. Sap shall not be considered a material injury if bright and in good condition.

Firsts and Seconds must be eight inches wide and over. It must be clear, excepting bright sap, up to 10 inches in width. At over 10 inches defects may be allowed equivalent to two standard knots.

Common shall comprise all boards and plank containing more than two standard knots, or that are less than eight inches wide, but must be free of heart shakes, rot, dote or worm-holes. Cull—all below common that is available one-half. Market sizes shall be 1, 1¼, 1½, 2, 2½, 3, 3½, 4 and 5 inches.

Wagon tongues must be cut from tough timber, straight and free from all defects.

Flooring strips must be four and six inches full in width, and have one face and two edges clear.

Common and cull strips not marketable.

WHITE, BURR AND RED OAK.

Shall be classed as First and Second Clear, Common and Culls.

Grades shall be same as for ash, except that plank containing sound heart shall be classed as common.

Wagon stock must be free from all defects.

HICKORY.

Hickory shall be classed as boards, plank and axles. Boards and plank shall be inspected in firsts and seconds in one grade, and must not be less than six inches wide if less than two inches thick; this grade shall not admit of more than one or two standard knots or bright sap, but no other imperfections.

Axles must be free from all defects, except sap.

Culls include all lumber not up to the preceding description.

Wane is permitted in boards and plank.

BLACK WALNUT.

Black walnut shall be inspected in grades Firsts, Seconds, Common and Culls.

Firsts shall not be less than seven inches wide, and must be free from all defects, excepting that a board or plank 10 inches or over wide may have two inches of bright sap.

Seconds shall not be less than six inches wide, and may have a little sap or one standard knot, up to eight inches wide; from eight to 14 inches may have two standard knots or their equivalent. Fourteen inches and over wide may have three standard knots and one inch of wane. Boards and plank otherwise clear may have heart-shakes or one bad knot if not over nine inches from one end. Sap on face side shall be measured out.

Common shall include all lumber not up to the standard of seconds, but available a full three-fourths of its size for use without waste, and may have heart or shake, not over 12 inches long.

Marketable thicknesses shall be 1, 1¼, 1½, 2, 2½, 3 and 4 inches.

Culls shall include any width not good enough for common, in which not less than one-half the piece is fit for use without waste.

Newels and balusters must be free from all defects, excepting what will turn off.

CHERRY.

Cherry counter tops must be strictly clear.

Cherry shall be inspected in grades of Firsts, Seconds and Culls.

Firsts shall not be less than seven inches wide and must be free from all defects.

Seconds must not be less than six inches wide, absolutely free from hearts and gum spots; but when wider, may have a little sap or two standard knots. Sap on the face side shall be measured out. Defects may increase with the width in proportion.

Culls include all lumber not up to the standard of Seconds, but in which not less than one-half the piece is available for use without waste.

Newels and balusters must be free from all defects.

BUTTERNUT AND CHESTNUT.

Butternut and chestnut shall be inspected in Firsts, Seconds and Culls.

Firsts and Seconds must not be less than six inches wide, and clear up to eight inches, but at eight inches may have an inch of sap or two standard knots. Sap on the face side shall be measured out. Defects may increase with the width in proportion. Worm-holes are absolutely excluded from this grade.

Culls include all lumber not up to the standard of seconds, but available not less than one-half to work without waste.

SWEET GUM.

Sweet gum shall be inspected in grades of Firsts and Seconds and Common.

Firsts and Seconds must not be less than eight inches wide, and must be clear up to 10 inches. Over 10 inches may have two standard knots. Sap is wholly excluded from this grade.

Common shall include all lumber not up to the standard of Firsts and Seconds in which not less than three-fourths the piece is available for use without waste.

Culls worthless.

HARD MAPLE.

Hard maple shall be inspected in grades of Clear, Common and Culls.

Clear must embrace all boards and plank eight inches wide or over, and at eight inches must be free from all defects; at 10 inches may have one inch of wane on one edge, but shall be measured inside the wane.

Common must be seven inches and upward in width, and may have defects not injuring the piece for ordinary uses without waste. This grade will admit of two to four standard knots, but no shake.

Cull shall include all heart-shake, badly sawed or otherwise defective lumber, unfitting the piece for common, but in which one-half the piece is available for use without waste.

Clear flooring must have one face and two edges clear.

Common flooring shall be of the same size and general character as clear, but may have one or two small sound knots of not more than three-fourths inch in diameter, or a small wane on one edge, which will not injure it for working its full size without waste.

BASSWOOD, SOFT MAPLE, ELM, SOFT ELM, SYCAMORE, BEECH, COTTONWOOD AND BIRCH.

The above named varieties of lumber shall be classed under an inspection of good and cull, and shall not be less than six inches in width.

Good shall include all sound lumber free from shake and hearts. Standard knots from one to five in number do not condemn from this grade in proportion to the width of the piece.

Culls include all lumber not good enough for the preceding grade, but in which one-half the piece will work without waste.

YELLOW PINE.

Shall be classed as Clear, Second Clear, Common and Cull.

Clear must be 10 inches or more in width, and free of all defects.

Second Clear must be seven inches or more wide, and bright sap not called a defect. Will allow one or two small sound knots, not over three-fourths of an inch in diameter showing through, if free of other defects. Face being clear, one narrow wane may be allowed. Blue stain that will dress out shall not injure this grade. First and Second may be classed together.

Common shall include all lumber poorer than described as Seconds, but must be sound lumber; or less than one inch thick.

Culls include all large unsound knots or shake, and all lumber which will not work one-half without waste.

Flooring strips shall be three, four and six inches wide, and be classed as First and Second Clear, Common and Cull. First and Second Clear, three and four inches wide, may have one sound knot not over one-half inch di-

ameter, and free of other defects. Strips six inches wide may have one sound knot not over three-fourths of an inch in diameter, and no other defect. No strips in this class shall have knot on edge of piece. Bright sap or blue stain, if it will dress out, shall not be classed as defect. Common shall contain all sound strips below Firsts and Seconds, and all blued sap pieces. Knots large enough to weaken a strip will throw it into culls. Culls, all unsound pieces.

Step plank, First and Second Clear, must not be less than 10 inches wide, and be 1, $1\frac{1}{4}$, $1\frac{1}{2}$ and 2 inches thick, and be inspected same as boards, excepting must have no splits.

Boards and strips shall be full one inch in thickness.

Wagon bottoms must be one inch full thick, six, eight, 10 and 12 inches wide, 11 feet long. Must be good, sound lumber, blue sap or standard knots, without regard to number, being no objection, if knots are not on edge.

Timber and joists must be square edge, and have no defects that will impair the strength of the piece for purpose intended.

CYPRESS.

Boards and plank shall be in lengths of 12, 14 or 16 feet, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$ or 4 inches thick, and be classed as Clear, Second Clear, Common and Cull.

Clear shall be 10 inches and over wide, and free of all defects. Second Clear shall be eight inches and over wide, and clear up to 10 inches; at 10 inches and over may have two standard knots and three inches of bright sap. Free of other defects may be one-half bright sap. Clear and Second Clear may be combined as one grade, and must be free of shakes or pecks.

Common will contain all sound lumber under second class and all shaky lumber that is available three-fourths.

Cull shall comprise all unsound lumber that is available one-half.

Shakes and pecks are always a damage in cypress, and should be closely scrutinized.

Strips must be 12, 14 or 16 feet long, one inch thick by six inches wide, unless otherwise ordered, and be classed as clear and second clear, common and culls.

Clear shall be free of all defects. Second clear will allow one sound knot $\frac{3}{4}$ inch in diameter, or in place thereof be one-half sap on sap side. First and second clear may be classed as one grade.

Common will comprise sound pieces below second clear, or pieces all sap.

Cull—all unsound pieces available one-half.

RED CEDAR.

Boards must be sound and sawed to thickness ordered.

Posts may be quartered or squared, hewed or sawed, and seven or eight feet long. Quartered posts must have two faces, sawed four inches wide at top or small end, and be straight and sound. Square posts and dimension lumber must be sound to sizes ordered.

YELLOW PINE CLASSIFICATION AND INSPECTION.

Adopted by the Southern Lumber and Timber Association at a Meeting held in Savanna, Ga., February 14, 1883.

CLASSIFICATION.

Flooring shall embrace four and five quarter inches in thickness, by three to six inches in width. For example: 1x3, 4, 5 and 6; 1¼x3, 4, 5 and 6.

Boards shall embrace all thicknesses under one and a half inches by seven inches and up wide, including one and a half inches in thickness by seven in width. For example: ¾, 1, 1¼ and 1½ inches thick by seven inches and up wide.

Scantling shall embrace all sizes from two to five inches in thickness, and two to six inches in width. For example: 2x2, 2x3, 2x4, 2x5, 2x6; 3x3, 3x4, 3x5, 3x6; 4x4, 4x5, 4x6; 5x5 and 5x6.

Plank shall embrace all sizes from one and one-half to five inches in thickness by seven inches and up in width. For example: 1½, 2, 2½, 3, 3½, 4, 4½ and 5x7 and up wide.

Dimension sizes shall embrace all sizes six inches and up in thickness by seven inches and up in width, including six by six. For example: 6x6, 6x7; 7x7, 7x8; 8x8, 8x9 and up.

Stepping shall embrace one to two and a half inches in thickness by seven inches and up in width. For example: 1, 1¼, 1½, 2 and 2½x7 and up wide.

Rough edge or flitch shall embrace all sizes one inch and up in thickness by eight inches and up in width, sawed on two sides only. For example: 1, 1½, 2, 3, 4 and up thick by 8 and up wide, sawed on two sides only.

SQUARE-EDGED INSPECTION.

Flooring shall show no wane, shall be free from through or round shakes or knots exceeding one inch and a half in diameter, or more than six in a board; sap no objection.

Boards shall show no wane, shall be free from through or round shakes, large or unsound knots; sap no objection.

Scantling shall be free from injurious shakes, unsound knots, or knots to impair strength; sap no objection.

Plank shall be free from unsound knots, wane, through or round shakes; sap no objection.

Dimension sizes—Sap no objection; no wane edges; no shakes to show on outside of stick.

All stock to be well and truly manufactured, full to sizes, and saw-butted.

MERCHANTABLE INSPECTION.

Flooring shall show one heart face, regardless of sap on the opposite side, free from through or round shakes or knots exceeding one inch in diameter, or more than four in a board on the face side.

Boards—Nine inches and under wide, shall show one heart face and two-thirds heart on the opposite side. Over nine inches wide shall show two-

thirds heart on both sides; all free from round or through shakes, large or unsound knots.

Scantling shall show three corners heart, free from injurious shakes or unsound knots.

Plank—Nine inches and under wide shall show one heart face, and two-thirds heart on the opposite side. Over nine inches wide shall show two-thirds heart on both sides; all free from round or through shakes, large or unsound knots.

Dimension Sizes—All square lumber shall show two-thirds heart on two sides, and not less than one-half heart on two other sides. Other sizes shall show two-thirds heart on faces, and show heart two-thirds of the length on edges, excepting where the width exceeds the thickness by three inches or over, then it shall show heart on the edges for one-half the length.

Stepping shall show three corners heart, free from shakes and all knots exceeding half an inch in diameter, and not more than six in a board.

Rough edge or flitch shall be sawed from good heart timber, and shall be measured in the middle, on the narrow face, free from injurious shakes or unsound knots.

All stock to be well and truly manufactured, full to sizes, and saw-butted.

PRIME INSPECTION.

Flooring shall show one entire heart face, and two-thirds heart on the opposite side, clear of splits, shakes, or knots exceeding one inch in diameter, or more than four in a board.

Boards shall show one heart face, and two-thirds heart on opposite side, free from shakes or large or unsound knots.

Scantling shall show three corners heart, and not to exceed one inch of sap on fourth corner, measured diagonally, free from heart shakes, large or unsound knots.

Plank shall show one entire heart face; on opposite face not exceeding one-sixth its width of sap on each corner, free from unsound knots, through or round shakes; sap to be measured on face.

Dimension Sizes—On all square sizes the sap on each corner shall not exceed one-sixth the width of the face. When the width does not exceed the thickness by three inches, to show half heart on narrow faces the entire length; exceeding three inches, to show heart on narrow faces the entire length; sap on wide faces to be measured as on square sizes.

Rough edge, or flitch, shall be measured in the middle on narrow face, inside of sap, free from shakes or unsound knots.

CLEAR INSPECTION.

Flooring, stepping and boards shall be free of knots, sap, pitch and all other defects.

Scantling shall be free of sap, large knots and other defects.

Plank shall be free of sap, large knots, or other defects.

Dimension sizes shall be free from sap, large or unsound knots, shakes, through or round.

DESIGNATIONS OF THE TRADE.

Re-sawed Lumber—Lumber sawed on four sides.

Rough Edge, or Flitch—Lumber sawed on two sides.

Timber—Hewed only.

WILLIAMSPORT INSPECTION.

The well known Allegheny region is largely represented by the operators at Lock Haven and Williamsport, Pa., and the inspection customs of the former are governed by the rules of the West Branch Lumberman's Exchange, as is the case in the surrounding country, outside of those two points, where lumber is handled to any extent. As the shipments from this section are largely to Philadelphia and Baltimore, a knowledge of the inspection customs of the producing point, conveys as well an idea of the inspection at the consuming or distributing points. As in all other markets allowance must be made for variation in practice, while the rules are observed as a standard.

RULES OF INSPECTION

Adopted by the West Branch Lumberman's Exchange, and in vogue at Williamsport and contiguous points.

Selects and Better.—Shall include all the better grades which are equal in value to the following described piece: not less than eight inches in width, and perfect up to ten inches in width, except sap, which may be admitted one and one-half times the thickness on the back side.

Above ten inches wide will admit of imperfections equal to three small knots, and sap one and one-half times the thickness on face side; above fourteen inches wide will admit of imperfections equal to sap as above, and larger knots and straight split one-sixth the length of the piece; as the width increases, will admit of greater imperfections, but not enough to decrease the value below the first described piece.

Picks.—This grade shall include all boards below the grade of Selects and better, that shall be equal in value to a piece of from six to nine inches wide, that shall have a perfect face, with back side sound and free from badly stained sap.

Above nine inches wide, will admit of defect equal to sap two inches on either edge of face side, and knots equal to one knot two and one-half inches in diameter.

Above thirteen inches wide may admit of defects equal to sap nine inches in width on either edge of face side, and three knots two and one-half inches in diameter. All boards of this grade above ten inches may admit of straight split, one-sixth the length of the piece, but no board shall be of less value than the first described piece.

Flooring.—Shall include all boards below Picks that shall be five inches in width, with red, sound knots not exceeding one and one-half inches in diameter. Will admit of sap one and one-half times the thickness of the piece, and when above ten inches in width may admit of straight split one-sixth the length of the piece, and should be free from shakes, rot and loose knots.

Third Common or Barn Boards.—Shall include all lumber below the grade of flooring that is of fairly sound character. May admit of straight split one-quarter the length of the piece, and should be free from large loose knots, bad shakes and rot.

Culls and Samples.—Shall consist of all lumber of a generally unsound character, and where the imperfections are too great to allow of the board being used for the ordinary uses of Third Common or Barn Boards. Worthless, rotten lumber should not be counted in this grade.

Pickets.—No. 1. Shall be clear of knots, wane and black sap; not less than seven-eighths inch thick and two and a half inches wide.

No. 2. May include sound knots, stained sap and wane not to exceed one-half the thickness of picket.

Square Pickets to be of same grades.

Lath.—No. 1. Shall be one and a half inches wide, not less than three-eighths of an inch thick, packed in bundles of 100 pieces to each bundle.

Hemlock.—Shall consist of two grades; merchantable and cull hemlock.

Shingles.—Are graded Nos. 1 and 2, and are twenty-four inches in length.

No. 1. Should be clear of sap and knots; five-eighths-inch at the butt and one-eighth-inch at the point.

No. 2. Should be clear at least one-third the length from the butt, but the balance will admit of small knots, if sound, and some sap.

MAINE SURVEY.

Maine was at one time the heaviest producing section in White Pine. Fifty years ago the lumberman of New York, Connecticut and contiguous states, made annual ocean voyages to Bangor and other points in Maine for their supplies of Pine and Spruce lumber and timber, and the hardy lumbermen of that day, or their sons and successors, have been among the most forward and enterprising agents in the settlement of the then unknown forests of the Northwest. Year by year have the forests of Maine yielded to the brawn and muscle of the lumbermen, and the in-

satiate appetite of the saw mill, until to-day the character of the Pine resources of the state is well depicted in the designations which attest the prevailing systems of Inspection. While the quantity of pine is very much reduced, the quality of it has also deteriorated in proportion, and the "Survey" is less to the advantage of the purchaser. Maine still boasts a large supply of Spruce and Hemlock, and will be able to supply these for many years to come. In fact, from the well known rapid growth of Spruce, the state will, for a generation at least, be still able to supply its quota, and one-half the state will always be productive forest as the land is worth more to grow timber on than any other crop, and is only culled, not cleared.

The Survey of Spruce is rather in favor of the purchaser.

PINE.

No. 1.—Is entirely dispensed with, and the first quality now recognized is called No. 2.

No. 2.—This may be of any length or width, provided, however, that the short lengths and narrows must be good; the shorter and narrower the board, the better the quality required. A board twelve feet long and five or six inches in width, must be entirely free from knots and sap, and must be straight in grain. Larger boards must be nearly free from knots, sap and shake.

No. 3.—Must be free from shakes, but a few knots or a little sap will not condemn it. The size of the board goes far to determine this quality; very small pieces otherwise up to grade, would be classed as No. 4.

No. 4.—Is a small board usually free from knots, but with some sap. If large boards are put in this number, it is because one-quarter or one-third of the piece is shaky, although the balance may be good.

The market recognizes, also, two kinds of shipping boards designated "Shippers", viz.: Smooth and Common.

Smooth Shippers.—Are boards without shake or case knots, or any large knots.

Common Shippers.—Are boards coarse and knotty, eight inches and upward in width, and twelve feet and upward in length, (These are sometimes manufactured under special orders, when they may be nine inches, ten inches, or even greater widths.) In this grade splits, red streaks or very shaky boards are objectionable.

Narrows, or Narrow Boards.—Is the next grade to Common Shippers, and consists of boards too small for Shippers. These must not be very coarse; must be suitable for floor boards.

Poor Fours.—These consist of sappy, shaky, or knotty boards, not suited to be classed in either of the foregoing descriptions.

Scoots.—Are the lowest grade; rotten boards and all others not admissable in other grades are surveyed as scoots.

The market also handles what is termed Sapling Pine or Gang Boards. These are usually manufactured in gang mills, the survey as to quality being about the the same as the balance of the grades described, except as to designation, the twos, threes and fours being put together under the one term Planers. The shippers, narrow boards, poor fours and scoots are surveyed as described in those heads.

Gutter and Deck Plank.—The rule last described is also applied to gutter and deck plank.

SPRUCE.

Spruce is known in the two qualities of Merchantable and Scoots. The Scoots comprise boards which are cross grained, renty or rotten. In surveying the grades are divided into two qualities, viz.: Floor Boards and Coarse. The floor boards must be nearly free from knots; all others are coarse.

BURLINGTON, VT., INSPECTION.

Although doing a large business in lumber the extensive market of Burlington has no systematized method of inspection. Steps are, however, in progress looking to that end, and probably before long rules and regulations regarding inspection will be adopted by the dealers in that section. While each lumberman now has an inspection of his own, a variety of customs prevail, notwithstanding an endeavor on the part of all toward uniformity.

The grades recognized in the Burlington market are as follows: Selects, Shelving, Second Shelving, Pickings, Shippers, Box and Mill Culls.

These gradings apply to wide lumber from eight inches and upward.

Strips twelve feet long and upward are classed as First Quality, Second Quality, Third Quality and Box.

Under twelve feet in length the classes of First and Seconds are combined as one, while all unfit for this grade go into a still lower grade of Third Quality or into a new grade of Box.

Spruce is divided into three grades, namely: Clear, number One and number Two. (See Maine Survey.)

Selects.—Comprise the finer grades of lumber, and include all fair widths approaching to the upper grades of other markets, and suited to all the finer finishing purposes, for which the timber is adapted.

Shelving.—Includes ten, twelve and fourteen inch stock, and is classed as First and Second Shelving, as to relative quality and adaptability to

the purpose indicated; First Quality ranks about $7 per thousand below uppers, while the Second Quality is from $5 to $7 below the First. In both qualities more or less knots and sap may be allowed, not affecting the board for the purpose from which it derives its name.

Pickings.—A grade of lumber of any width, suited to one side finishing, embracing sap boards, and generally such lumber as while from width not fitted for shelving, is more defective than Selects, yet filling a position which must otherwise be occupied by Selects. As in other markets, it may be called the cream of the Common. It is relatively in price about $12 below Selects.

Shippers.—Are of diversified widths, without shake or case knots, and free from large, coarse knots, comprising the best of the common after the Picks are removed.

Box.—Comprises a grade poorer than Shippers, yet taking the run of the common, in all fairly sound and merchantable lumber. In price it is from $2 to $3 below Shippers.

The grades of Shelving (First and Second), Pickings, Shippers and Box are, one and all, selections from Common, made with reference to adaptability to the uses indicated by their designations.

Mill Culls.—Are the poorest grade of lumber adapted to any utility, or recognized as merchantable, and bear the same description as the same grade in other markets.

NEW ORLEANS INSPECTION.

TIMBER.

Round.—Length of all logs measured to square butt of log, if with pins at ends, length measured inside of one of the pins, allowing the other. Proportional deductions made from length for extra pins or faults.

Octagon Logs.—Or logs having more than four faces, shall be measured at small end, string measure, girting the log, and one-quarter the girt shall be considered as the fourth of the square. Waney logs, however, not to be comprised amongst the above, but to be measured as explained hereafter.

If crooked, the lines shall be drawn to make the same the chord of the arc of each crook or bend, thus shaping it a perfect squared log from extreme points.

Cypress Timber.—In round logs, when pecky, ten feet off length of logs shall be allowed and deducted as compensation for said fault.

Poplar and Cottonwood.—In round logs to be received at inspection

must measure twenty-four inches in diameter, inside bark, by twelve feet long.

Black Walnut.—In round logs, none shall be received as merchantable measuring less than twenty-six inches in diameter, inside bark, and ten feet long, unless by special agreement.

Squared or Waney.—All logs to be measured gross and net. Gross measurement taken at largest end, or stump, for the square, and at the extreme length of log or spur if any in same. Net measurement taken mid-ways of the log, deducting for net on square logs one inch off two sides of logs, and if waney an additional reduction proportional to wane. In domestic timber with pins or pin-holes, the length for net measurement must be taken inside pins or pin-holes.

Logs of lengths under regulations to be called log ends, and shall be paid on their net measurement one-half price paid for logs of standard dimension.

Sawed or hewed timber shall be put up in three classes, viz: Choice, Prime and Merchantable.

Choice.—To be sound, square edged and square butted; must not show more than two inches of sap on either face, free from circular shakes or unsound knots.

Prime.—To be sound and square butted, to show heart on each face, may show place of wane not to exceed two feet at any one place, and that not more than three places in any one corner.

Merchantable.—To be sound and square butted, not more than three inches in width of wane on a corner; need not show heart on any side.

SPARS.

Mast Sticks.—Must be worked eight square, and must be straight, well hewed, and show heart every four feet in length on every face; free from coarse or unsound knots and other defects; knots over two inches in diameter are called coarse; ring knots and knots less than three feet apart condemned. Not more than four knots must be left in one spar, and must be worked with as little taper as possible.

LENGTH.	DIAMETER AT CENTER.	DIAMETER AT TOP.
66 feet.	Not less than 21 inches.	Not less than 17 inches.
69 "	" " " 23 "	" " " 18 "
76 "	" " " 26 "	" " " 19 "
79 "	" " " 27 "	" " " 20 "
82 "	" " " 28 "	" " " 21 "

Ordinary spars may be hewed four square, though eight square is preferred, may show wane on four corners full length, not over three inches wide in widest place; must show heart full length on four sides, taper as little as possible; must be straight and free from coarse or unsound knots

or other defects. Ring knots and knots less than three feet apart condemned. Not more than four knots must be left in one spar.

LENGTH.	DIAMETER AT CENTER.
66 to 68 feet	17 inches and upward.
69 to 72 "	18 " "
73 to 76 "	19 " "
77 to 80 "	20 " "
81 to 84 "	21 " "

Octagon spars measured with calliper, and square spars with dip rod (three inch hook). Size and length required to hold full. Fractional parts of an inch or foot not counted.

N. B. All the above correspond also to cypress, with only two exceptions. 1st. That cypress having small hollow knots inside the logs, when manufactured in lumber, such knots are not allowed in classes Choice and Prime, but only in class Merchantable. 2d. That cypress, whether it be timber or lumber, can be received in lengths of twelve feet and upward, unless differently stipulated by contract or agreement.

WHITE OAK AND ASH.

White Oak and Ash shall be No. 1, or choice, No. 2, or Prime, No. 3, or Merchantable.

Choice, or No. 1.—Logs to be from body of tree thirty-five or fifty feet long and upward, eighteen to thirty inches square and upward. To be square butted with saw, straight grained, free from heart or side rot, worm holes, large or unsound knots, splits, checks, shakes, frost or sun cracks; good, sound sap on two corners allowed, not to exceed one inch in each corner for every twelve inches in width. If hewn, free from spalls and ax scores, and not to taper over one and one-half inch for every twenty feet in length, and squared to sharp edge. Pins allowed, if these should be the only defect, provided same be found only at both ends, and one side of logs, and not further than six inches from each end, but none in the middle, nor on two sides of logs.

Prime, or No. 2.—Length to be from twenty-five to fifty feet and upward, and to be sixteen to twenty-five inches square and upward, straight grained. To be square butted with saw, splits or checks to be parallel to two sides of log on one end, and allowed at the other end if parallel to the same side of the opposite end. Sap if sound and good allowed on three corners, not to exceed one inch in each corner for every twelve inches in width. Timber to be free from worm holes, large and unsound knots, wind or other shakes, sun cracks allowed only on one side or face of logs; pins or pin holes allowed if not more than nine inches from each end, and only on one side of logs. Diameter of heart rottenness, if any, not to exceed one-twelfth of diameter of log, and not to exceed one foot for every

twenty feet in length, but no side rottenness allowed. If sawed or hewed, to taper as per Class No. 1, wane not to exceed one and one-half inch to perfect square of logs. If hewed, to be free from ax scores.

Merchantable, or No. 3.—Logs to be twenty to thirty feet and upward in length, and to be nothing under fourteen to twenty inches and upward square; to be square butted with saw, splits or checks allowed as in class No. 2. Sap allowed on four corners not to exceed one inch in each corner for every twelve inches in width. Timber to be free from large or unsound knots and worm holes. Wind or other shakes at one end of log received; sun or frost cracks allowed on two sides of logs, pins and pin holes at end and in middle, if not too numerous and only on one side of logs. Heart rottenness received as per Class No. 2, and a slight side rottenness received if only on one side. If log hewn, ax scores admitted if not too numerous. Wane not to exceed two inches to perfect square of logs. Logs to taper two inches for each twenty feet in length. Any timber not within above classification is called rejected, and cannot be branded as inspected, though by special contract it may be accepted by purchasers.

Classification of Pine, Cypress. Poplar, Cotton and other soft woods. All kinds of lumber are measured full contents, the question of sap, etc., etc., being always determined by contract and stipulated classification of same.

Flitch.—All kinds of flitch to be measured at small end of pieces, inside sap on one edge, and sap measured on the other edge.

Deals.—Deals shall be put in three classes, viz.: Choice, Prime and Merchantable.

Choice.—Sound, square edged and square butted with saw, all heart with exception of small streaks of sap on one face, comparatively free from knots, and entirely free from shakes and splits, nine inches and upward in width, three inches and upward in thickness, and twelve feet and upward in length.

Prime.—Sound, square edged, and square butted, one heart face, three-fourths heart on the other face, entirely free from shakes, splits, large or unsound knots, nine inches wide and upward, and twelve feet long and upward.

Merchantable.—Sound, square edged and square butted. one heart face, and show heart on the other face, free from through shakes, splits and unsound knots, nine inches wide and upward, three inches thick and upward, and twelve feet long and upward.

Scantling.—Scantling shall be put in two classes, viz.: Prime and Merchantable.

Prime.—Must be square edged, three corners heart, sound, evenly sawed, free from large or unsound knots, through shakes or splits, twelve

feet long and upward, sizes 2x3 to 11x11 inclusive. Since from 8x8 to 11x11 inclusive may show sap on all corners, but not to exceed one to one and one-fourth inch on any one corner, in proportion to the width of the scantling.

M rchantable.—Sound, square edged, evenly sawed, free from through shakes and splits, sizes same as Prime. Four corners sap allowed as in class Prime.

Plank.—Plank shall be put two classes, viz.: Prime and Merchantable.

Prime.—Must be sound, one heart face, two-thirds heart on the other face, square edged, evenly sawed, free from through shakes or splits, large or unsound knots, one and one-fourth to three inches thick, by ten inches and upward, and twelve feet long and upward.

Merchantable.—Sound, one heart face, evenly sawed, square edged, free from through shakes, splits or unsound knots, one and one-quarter to three inches thick, ten inches wide and upward, twelve feet long and upward

Flooring.—Flooring shall be put in three classes, viz.: Clear, Prime and Merchantable.

Clear.—Must be sound, free from sap, knots, shakes and splits.

Prime.—Must have one face free from sap, and the opposite merchantable.

Merchantable.—Must show one-half heart on most sappy face the whole length, free from through and round shakes or unsound knots.

All flooring must be sawed plump for any size it is calculated for.

Edge boards must be one or one and one-fourth inch thick, any width or length, must be sound, square edged, free from loose knots or splits, and show heart on both sides.

All lumber of a merchantable quality and upward must be square butted. All refuse cullings, or lumber of a quality below these classifications to have no class, but be sold on its merits. Cypress lumber has two special classifications besides those similar to pine, as follows:

Narrow.—To be from four to nine inches in width, three-quarters to one inch thick, and must be sound, square edged and free from sap.

Box Stuff.—To be of any width from two inches and upward, and of one inch full thickness, square edged, and free from sap.

Lumber.—Is to be classed also No. 1, or Choice, No. 2, or Prime, and No. 3, or Merchantable.

Choice, or No. 1.—Shall be sound, square edged and butted with saw, and evenly sawed. Widths to be from twenty to thirty inches and upward. Thickness from one-half to eight inches. Length from twenty-five to fifty feet and upward. Entirely free from splits, checks, large and unsound knots, pins or pin holes, frost or sun cracks, worm holes,

wind or other shakes, and with only one-eighth of an inch of sound sap on one corner, for every twenty inches in width.

Prime, or No. 2.—Shall be square edged, butted with saw and evenly sawn. Widths from sixteen to twenty inches and upward. Length from twenty to fifty feet and upward; entirely free from shakes, frost and sun cracks, splits, large or unsound knots and worm holes. Only two pins or pin holes accepted at each end at six to nine inches from end, and one inch sound sap on two corners allowed for every sixteen inches in width.

Merchantable, or No. 3.—Shall be square edged, square butted with saw, and evenly sawn. One heart face on one side and must show heart on two-thirds of length of other face; sap, however, must be sound. Free from through shakes or through splits, and entirely free from large or unsound knots. Pins or pin holes as per Class No. 2. Sun and frost cracks allowed on sappy face only, and not to go beyond two inches in depth on any one face. Lengths from sixteen to twenty feet or more.

Flitch.—Same classifications but dimensions to be taken as stated under the head of Classification.

BLACK WALNUT, CHERRY AND OTHER DOMESTIC HARDWOODS.

Timber.—Shall be put in four classes, viz.: No. 1, or Choice; No. 2, or Prime; No. 3, or Merchantable, and Refuse.

Choice, or No. 1.—Logs to be from body of tree, straight grained, and from twelve feet and upward in length, and from twenty-eight inches and upward square; to taper only three-quarters to one inch for every twelve feet in length. To be square butted with saw, free from all defects to make it suitable to best kind of work. Wane allowed one and one-half inch to full square of log for every ten inches width or depth. Pins allowed, if this be the only defect, provided the same be found only at both ends, and on one side of logs, and not farther than six inches from each end.

Prime, or No. 2.—Logs from body of tree, and in length same as No. 1, and with same taper, and from twenty-two inches and upward square. To be straight grained, square butted with saw, free from shakes, bad or large knots, heart or side rottenness, one and one-half inch for every ten inches in width or depth allowed for wane and corresponding sap to same, also pins at both ends of logs, but not further than six inches from each end, and shall be free from splits not parallel to one face.

Merchantable, or No. 3.—Logs in length of ten feet and upward, and eighteen inches square and upward. Taper and wane allowed as in class number two; free from bad shakes, large or unsound knots, and bad splits; pins allowed as in class No. 2, also splits at the ends of logs though not parallel to sides.

Refuse.—All timber losing one-third or more of its measurement as

allowance for defects shall be called Refuse, and will be considered unfit for shipment unless differently stipulated in contracts of sale.

Lumber.—Shall be divided in three classes, viz: No. 1, No. 2 and Refuse.

No. 1.—Includes all boards, planks and joist free from rot, shakes, and nearly free from knots, sap and bad taper. All pieces to be evenly sawed, square butted, and square edged. Knots to be small and sound, and so few as not to cause waste to the best kind of work. A small split on one end of a board or plank if not too long and parallel with edge of piece, is also classed No. 1.

No. 2.—All pieces must be square edged and evenly sawed; this class includes all other descriptions if so manufactured, except when one-third is worthless, that is, boards, joist or planks containing sap, knots, splits on one end, and all these imperfections combined make less than one-third of a piece unfit for good work, and only fit for ordinary purposes, such piece is classed No. 2.

Refuse.—Includes all boards, planks or joists badly manufactured by being sawed in a diamond shape, smaller in one part than in another, splits on both ends, or with long split or splits not parallel to edge, with large and bad knots, worm or pin holes, sap, rot, shakes, or other imperfections which would cause any one piece of lumber to be one-third worthless or waste.

MAHOGANY, SPANISH CEDAR, AND OTHER LIKE FOREIGN HARDWOODS.

Timber.—Shall be put in four classes, viz.: Choice, Prime, Merchantabe and Refuse.

Choice Cedar.—Must be straight grained, free from knots and all and every other defect. Shall be manufactured straight and evenly, may be hewed or sawed and ought to be square butted with saw before shipment, as all slant heads will be deducted from gross to sale measurement, full up to perfect square of logs, which must measure from twelve feet and upward long, and eighteen inches and upward square. Wane of three-fourths of one inch to perfect square is permitted, but is invariably deducted in its proportional ratio to the log from gross to sale measurement.

Choice Mahogany.—Will correspond to above specifications, except that logs may be curly or cross-grained, and sizes must be twelve feet long and upward, and twenty inches and upward square.

Prime Cedar.—Must be straight grained and free from large knots, small ones, if sound, being allowed. Shall be manufactured as in class Choice. Wormy sap not objectionable if worm-holes do not go through to the body of the wood, and a wane of two inches to perfect square of logs is permitted, also, rotten or decayed heart not to exceed one-eighth of

length of log; splits not to be over six inches for every ten feet of length of log, and sun checks not to be over two inches deep in any one face are also permitted, and though all these defects are permitted, they are invariably deducted from gross to the net, or sale measurement. Logs must be ten feet and upward long, and sixteen inches and upward square.

Prime Mahogany.—Shall correspond to all the above specifications except the logs may be cross-grained, curly and have large knots, if sound, and that sizes must be ten feet long and upward, and eighteen inches and upward square.

Merchantable Cedar.—Logs may be manufactured somewhat uneven, but ought to be square butted with saw, as explained in class Choice. Can be crooked, waney, sappy, wormy, split, sun checked, and have rotten heads and knots, large or small, provided the logs shall not lose more than one-third from the gross to the net sale meaurement for these defects. Logs can be from nine feet long and upward, and fourteen inches square and upward. Wood may be curly or cross-grained.

Merchantable Mahogany.—Shall correspond to all the above specifications.

Refuse Cedar and Mahogany.—All other descriptions of wood admitted in this class which by its defects will lose more than one-third from the gross to the net sale measurement, provided logs shall measure nine feet long and upward, and twelve inches square and upward.

Lumber.—Shall be put in three classes, viz.: Choice, Prime and Merchantable.

Choice.—Includes all boards, planks and joists to be square edged, evenly sawed and free from sap, rot, shakes or splits, knots, if any, to be small and sound, and free from any fault which may cause waste for the best kind of work.

Boards and planks to be not less than eighteen inches wide and upward.

Prime.—To be manufactured as class Choice; splits parallel to edge of piece allowed if not exceeding six inches long for every ten feet in length of piece. A streak of sap on two corners allowed, and pieces not to be less than fifteen inches and upward wide.

Merchantable.—Includes all other descriptions of boards, planks and joists, provided all imperfections combined shall not make one-third of the measurement of any piece, any such being rejected and not entitled to classification.

CIGAR CEDAR STUFF.

Cigar Cedar Stuff shall be put in two classes, viz.: No. 1 and No. 2.

No. 1.—All boards to be perfect, free of knots, splits, sap, worm holes, and any defect which would render any piece unfit for the best work.

No. 2.—Includes all other descriptions, except when one-third worth-

less, in which case any such piece is rejected, purchasers having the right to refuse them altogether.

All lumber, such as planks, boards, scantlings, joists, and deals, shall have their contents marked on each piece, and the certificate given by the inspector will state all items of specifications corresponding to the survey made, and also the number of pieces of each class.

For round timber the certificate of the inspector will only give the net contents of each log, and for square timber the logs shall be numbered, and the certificate of measurement must correspond to each number, giving both the gross and net measure of each, and the faults found when surveying them.

In all circumstances domestic timber of all descriptions, when rafted, will class Choice, if with no other fault in same but wooden pins needed for its safety in rafting it, provided, however, that same be placed only at both ends of logs not further than nine inches from each end, and none in the middle.

STAVES.

No. 1, pipe.....60	in. long,	5	to 6	in. wide,	1½	in. thick on thin edge	
No. 2, pipe.....56	"	5	" 6	"	1½	"	"
No. 3, pipe.....56	"	4	" 5	"	1	"	"
No. 1, hogshead..48	"	5	" 6	"	1½	"	"
No. 2, hogshead..44	"	5	" 6	"	1½	"	"
Claret staves.....40	"	5	" 6	"	1½	"	"
Barrel staves.....33	"	5	" 6	"	1½	"	"

All of the above staves must be made of white oak, over cup or cow oak, and riven with the grain to as equal thickness as possible. If in riving, a stave is thicker on the back, the surplus timber should be taken off, thus making both edges about even in thickness. An allowance of two inches should be made for crooked sawing, otherwise many staves will be under the required length. Staves must be clear of sap, heart, knots, short crooks, wind shakes and worm-holes. The proper manner of sapping is to strike the stave at the end, leaving a slight bulge in the center. The timber must be cut when the sap is down, that is during the fall and winter. When a stave is spoiled by any of the defects above named, it should be sawed down to the length of a shorter dimension, as many defective sixty-inch staves by sawing would make good forty-four, forty or thirty-three inch staves. Staves are sold by the thousand of 1,200 pieces.

Hoop poles should be of smooth barked hickory, free from heavy butts and switch tops. Hogshead poles twelve to fourteen feet in length and one full inch in diameter at the top. Barrel poles eight feet in length and full three-fourths of an inch at the top. Half barrel poles seven feet long, one-half inch at top.

POPLAR INSPECTION.

Adopted by the Poplar Manufacturers and Wholesale Dealers Association, held at Cincinnati, Ohio, May 15, 1888. This inspection is designed to supersede all others in the poplar producing districts except for strictly local trade.

GENERAL INSTRUCTIONS.

In poplar lumber inspection rules the inspector is instructed to use his best judgment, based upon the general rules laid down for his guidance. He must inspect all boards and plank on the poorest side. The standard knot is to be considered as not exceeding 1¼ inches in diameter, and of a sound character. Splits are always a greater or less damage to poplar lumber, and will reduce a piece to one grade lower if the split is over 12 inches in length in boards and plank, or 6 inches in strips, but splits must be straight, and in one end only to be allowed. All lumber must be sawed so that it will be of the standard thicknesses when seasoned. All lumber must be sawed square edged, unless otherwise ordered, and boards and planks having bark and wane must be reduced one grade and measured inside wane or bark. All boards 1 inch and under thick shall be measured face measure; if sawed scant it must be placed in next thickness below. All badly mis-sawed lumber shall be classed as culls. No cull is considered as having a marketable value which will not work one-half its size without waste. The lumber sawed for specific purposes must be inspected with a view to the adaptability of the piece for the intended use, as in many cases it cannot be utilized for the purposes. In the inspection of combined grade of firsts and seconds, 60 per cent shall be firsts, and may contain 40 per cent seconds. Standard lengths are always recognized as being 12, 14 and 16 feet, but 10 per cent of 10-foot lengths may be allowed. Shorter than 10-foot does not come within the range of marketable, although sometimes admitted. Squares: The sizes shall be 4x4, 5x5, 6x6, 7x7, 8x8, 9x9 and 10x10. Worm holes are to be considered as one of the most serious defects in poplar lumber.

FIRST CLEAR—1 TO 2 INCHES IN THICKNESS.

Shall be 8 inches and upward wide and absolutely clear up to 10 inches in width. At 11 inches 1 inch of bright sap will be allowed. At 12, 13, 14 and 15 inches wide 2 inches of bright sap will be allowed, or 1 standard knot. At 16 inches and over in width 3 inches of bright sap on one edge will be allowed, or 2 standard knots.

SECOND CLEAR—1 TO 2 INCHES IN THICKNESS.

Shall be 8 inches and upwards in width, and at 8 and 9 inches wide will admit of 1 inch of bright sap, but no other defects. At 10, 11 and 12 inches wide will admit of 2 inches of bright sap and 1 standard knot. At 13, 14 and 15 inches wide will admit of 3 inches of bright sap and 1 standard knot, or 2 standard knots if there is no sap. At 16 inches and over will admit of 5 inches of bright sap and 1 standard knot; if there is no sap then 3 standard knots will be admitted.

2½, 3 and 4 inches, first and second shall be 10 inches and over wide; ⅜, ½, ⅝ and ¾, first and second clear, shall be 10 inches and over wide, and contain not less than 75 per cent firsts.

SQUARES.

Shall be of the combined grade of first and second clear. 4x4's must be clear of all defects excepting ½ inch of sap on the face side; 5x5 and 6x6 will admit of 2 inches of bright sap on one face; 7x7, 8x8, 9x9 and 10x10 will admit of 3 inches of bright sap on one face.

Squares must be free of hearts and unsound knots.

SAP CLEAR.

Shall be sound but not black and 6 inches and over in width and free of all defects.

COMMON.

Shall include any width not less than 6 inches, and will allow of bright or dis-colored sap and knots beyond those described in second clear. Two unsound standard knots will be allowed in this grade, if over 12 inches wide; and straight splits shall not be considered a defect; otherwise lumber must be sound.

CULL.

Shall include all grades not up to the standard of common and must be available one-half of its size without waste.

POPLAR STRIPS.

Shall be 4 and 6 inches wide and known as clear, second clear and common. Clear shall be free of all defects. Second clear may have bright sap, but free of other defects. Common shall contain from 1 to 4 standard knots and slight amount of discolored sap.

GRADES OF MANUFACTURED LUMBER.

Beveled Siding—Worked to 5⅜ inches wide.

Firsts and Seconds—1 inch sap or 1 small knot admitted on thin edge, but no other defect; selects—sound sap no defect; common—may contain not to exceed 3 standard knots or pin holes, sap no defect.

Ceiling and Patent Siding—Firsts and seconds; one clear yellow face; selects—sound sap no defect; common—not to exceed 3 standard knots.

Casing and Base—Same as ceiling.

Flooring—To be worked 3¼ and 5¼ inches wide; firsts and seconds, one clear yellow face; selects—sound sap no defect; common—4 or more standard knots, sap no defect.

Moldings—Sap no defect.

All worked material to be sold count measure.

STANDARD WEIGHTS.

Rough dry inch lumber; 2800 pounds per 1000 feet.

Dressed lumber, per 1000 feet, board measure: Lumber, one inch and over, 2250 pounds; Bevel siding, 900 pounds; ⅜-inch ceiling, 800 pounds; ½ inch ceiling, 1250 pounds; ⅝-inch ceiling 1500 pounds ⅞-inch ceiling, 2000 pounds.

QUEBEC CULLING.

Extracts from the Culler's Act, giving Rules for the Measurement of Timber, Masts, Spars, Deals, Staves, Etc., Etc.

All culling in Quebec must be done under the specification of an act of the Provincial Parliament, from which we extract the following salient points:

All square timber must be measured by one of three modes.

First.—Measured off in the raft or otherwise, giving the full cubical contents without allowance or deduction.

Second.—Measured in shipping order (which shall mean sound, fairly made timber); gum seams closed at the butt, and sound knots not be be be considered unsoundness—lengths under the merchantable standard hereinafter mentioned, and not less than twelve feet long to be received if, in the opinion of the Culler, the same be fit for shipment.

Third.—Culled and measured in a merchantable state, in accordance with the rules, standards and limitations hereinafter described. (8 Vic., cap. 49, sec. 9.)

In measuring timber the Culler employed for that purpose shall measure the length of each piece, together with the girth, and shall provide himself with a measuring rod and tape, which shall, in all cases, be English measure, tested and compared with a standard kept in the office of the Supervisor (such rod having a hook at the end five-eighths of an inch long); and also a scribing knife, with which he shall mark in legible characters, the length, breadth and thickness of all square timber measured or culled by him, and the mark, initials or number of the party, if required. And every Culler shall provide himself with a proper stamp, with the initials of his name in legible characters. and with the following capital letters in addition:

M, which shall denote what is merchantable.

U, which shall denote what is sound and of merchantable quality, but under merchantable size.

S, which shall denote what is second quality.

T, shall denote what is third quality.

R, shall denote what is rejected or unmerchantable; which marks shall be indented or stamped on the end of each article of lumber culled, in terms of merchantable standard hereinafter described, except West India and barrel staves, boards, lath wood and handspikes.

In all cases the Supervisor and Cullers shall be governed by the following descriptions, rules, standards and limitations, in ascertaining and certifying the merchantable size and quality of lumber submitted to their culling.

SQUARE WHITE OAK TIMBER.

First Quality.—Shall be free from rot, rotten knots, (affecting the surrounding wood), open rings and large grub or worm-holes; but small worm-holes and shakes shall be allowed, according to the judgment of the Culler.

Second Quality.—Shall be oak not coming within the definition of first quality, and which in the judgment of the Culler is not culls.

SQUARE HARD GRAY OR ROCK ELM.

Shall be free from rots, open rings and rotten knots, (affecting the surrounding wood); but shakes and slivers shall be allowed according to the judgment of the Culler.

WHITE, RED OR YELLOW PINE TIMBER.

Shall be free from rot, rotten knots (affecting the surrounding wood), worm-holes, open shakes and open rings; but sound knots shall be allowed, according to the judgment of the Culler.

SQUARE RED PINE TIMBER.

Shall be free from rots, rotten knots, (affecting the surrounding wood), worm-holes, shakes and splits; but sound knots shall be allowed according to the judgment of the Culler.

SQUARE ASH, BASSWOOD AND BUTTERNUT.

Shall be of the same quality as White or Yellow Pine square timber.

SQUARE BIRCH.

Shall be free from rot, rotten knots, splits and shakes and shall be allowed two inches of wane.

MASTS, BOWSPRITS AND RED PINE SPARS.

Shall be sound, free from bad knots, rents and shakes, and the heart-wood shall be visible in spots at or near the partners.

HICKORY HANDSPIKES.

Shall be six feet long, and three and a half inches square at the small end.

ASH OARS.

Shall be three inches square on loin, and five inches broad on the blade. The blade shall be one-third of the length of the oar; and such oars shall be cleft straight on all sides, and free from large knots, splits and shakes.

LATH WOOD.

Shall be cut in lengths of from three to six feet, and measured by the cord of eight feet in length, by four feet in height. To be merchantable shall be free from rot, and split freely; each billet may contain to the extent of three or four open case knots, provided they run in line, or nearly so; and it shall not have more than one twist.

PINE OR FIR BOARDS.

Shall not be less than ten feet in length, nor less than one inch in thickness, nor less than seven inches in breadth, equally broad from end to end, edged with a saw, or neatly trimmed by a straight line, and shall be free from rot, bad knots, rents and shakes, and of equal thickness on both edges from end to end; but the color alone of any board shall not be sufficient cause for its rejection, if it is in other respects sound and merchantable, and of the dimensions required by this Act.

WHITE OR YELLOW PINE DEALS.

First Quality.—To be merchantable. Shall be free from rot, rotten knots, grub worm-holes, open case knots, shakes and splits (a slight sun crack excepted); and sound knots and hard black knots to be allowed as follows: If not exceeding three in number, and not exceeding upon the average one inch and a quarter in diameter; if exceeding three and not exceeding six in number, and upon an average not exceeding three-quarters of an inch in diameter; this proportion of knots to be allowed for a deal eleven inches in width and twelve feet in length; and deals of greater or less dimensions to be allowed for in proportion, according to the judgment of the Culler. Wane equal to half an inch on one side if running the whole length of the deal to be allowed; and if not exceeding half the length of each deal, three-quarters of an inch to be allowed; they shall be free from black or dead sap (with a slight exception), at the discretion of the Culler.

WHITE OR YELLOW PINE SECOND QUALITY DEALS.

Second Quality.—Shall be free from rot, rotten knots and splits, with

slight exceptions at the discretion of the Culler; and sound knots and hard black knots to be allowed as follows: If not exceeding six in number, and not exceeding upon the average one inch and a half in diameter; if exceeding six, and not exceeding twelve in number, and not exceeding upon the average one inch and one-quarter in diameter (small knots under half an inch in diameter not to be counted or considered), this proportion of knots to be allowed for a deal eleven inches wide and twelve feet in length, and deals of greater or less dimensions to be allowed for in proportion, according to the judgment of the Culler; heart shakes and sun cracks not exceeding three-fourths of an inch in depth to be allowed, as also worm-holes, at the judgment of the Culler; wane of half an inch to one inch to be allowed, according to the quality of the deal; in other respects at the judgment of the Culler. Deals rejected as not coming within the standard of merchantable, or second quality, shall be classed as culls, except that the Culler may, if requested by buyer and seller, select and classify as Third Quality the best of the deals so rejected.

RED PINE DEALS.

To be merchantable shall be free from rot, rotten knots, grub wormholes, open case knots and splits; several small sound knots to be allowed, according to the judgment of the Culler; heart shake to be allowed, if it does not run far into the deal, or form a split through at the ends; they shall be free (or nearly so) from black or dead sap; but sound sap in the corners or on a portion of one face of a deal to be allowed, according to the judgment of the Culler.

SPRUCE DEALS.

To be merchantable shall be free from rot, rotten knots, grub wormholes, open case knots, splits and shakes (a heart shake, not exceeding one-fourth of an inch in depth, excepted); several small sound knots and hard black knots to be allowed, according to the judgment of the Culler, and in the exercise of such judgment, he shall keep in view the peculiar nature of the wood, and govern his judgment accordingly; wane equal to half an inch on one edge, if running the whole length of the deal, to be allowed; and if not exceeding one-quarter the length of such deal, three-quarters of an inch to be allowed.

SPRUCE AND RED PINE DEALS.

Second Quality.—Shall be deals not coming within the definition of merchantable, and which, in the opinion and judgment of the Culler, are not culls, and shall be classed as second quality; and the Culler, if required by seller and buyer, may select and classify as THIRD QUALITY the best of the deals unfit to be Seconds.

QUEBEC STANDARD HUNDRED OF DEALS.

Shall be one hundred pieces, twelve feet long, eleven inches wide, and two and one-half inches thick; and deals of all other dimensions shall be computed according to said standard. Deals of all qualities shall not be less than eight feet long, seven inches broad and two and a half inches thick.

Deal ends shall not be less than six feet long; lengths should never fall short of full feet, or be more than two inches over length, and shall be computed according to the Quebec standard.

MERCHANTABLE DEALS.

Must be well sawed (this point must have especial attention), and squared at the end with a saw; and the color alone shall be no objection to their being merchantable. All deals when culled shall in all cases be stamped with the initials of the Culler, and the capital letter denoting their quality as such.

PROVISO AS TO SPRUCE DEALS.

Provided always that spruce deals, if not sawed at ends prior to or at the time of culling, shall be marked with the capital letter denoting their respective qualities, with red chalk, in large, bold letters.

HOW OTHER DEALS SHALL BE MADE.

To prevent mistakes in piling. all other deals shall be marked with bold strokes, in red chalk, as follows:

Merchantable shall be marked I.

Second quality shall be marked II.

Third quality (if made) shall be marked III.

Rejected, or culls, shall be marked X.

DIMENSION OF STAVES.

Standard or measurement staves shall be of the dimensions set forth in the words and figures following:

5½	feet	long.	5	inches	broad,	and	from	1 to 3	inches	thick.
4½	"	"	4½	"	"	"		1 to 3	"	"
3½	"	"	4	"	"	"		1 to 3	"	"
2½	"	"	5	"	"	"		1 to 3	"	"

HEART STAVES.

Five and a half feet long, and four and a half inches broad, to be received as if of merchantable dimensions.

STANDARD MILLE.

Shall be twelve hundred pieces of five and a half feet long, five inches

broad and one and a half inches thick; and standard or measurement staves of other dimensions shall be reduced to the said standard by the tables of calculation in use.

WEST INDIA OR PUNCHEON STAVES.

Shall be three and a half feet long, four inches broad and three-fourths of an inch thick; all staves shall be straight-grained timber, properly split, with straight edges, free from grub or large worm holes, knots, veins, shakes and splinters; and small worm holes, not exceeding three in number, to be allowed, according to the judgment of the Culler, provided there are no veins running from or connected therewith; and the Culler shall measure the length, breadth and thickness of standard staves, at the shortest, narrowest and thinnest parts; and the thickness of West India and barrel staves exceeding the standard breadth to be measured at such breadth, to wit: four, and three and a half inches, respectively, provided the thinnest edge is not less than half an inch.

TIMBER.

The dimensions of merchantable timber shall be as set forth in the following words and figures:

OAK TIMBER.

Shall not be less than twenty feet in length, or less than ten inches square in the middle.

ELM.

Shall not be less than twenty feet in length, or less than ten inches square in the middle.

WHITE PINE.

Shall not be less than twenty feet in length, and twelve inches square in the middle, and fifteen feet and upward in length, if sixteen inches and upward in the middle.

RED PINE.

Shall not be less than twenty-five feet in length, and ten inches square in the middle, and twenty feet and upward in length, if twelve inches square and upward in the middle.

BIRCH.

Shall not be less than six feet long, or less than twelve inches square in the middle.

TAPER OF MERCHANTABLE TIMBER.

Oak, three inches under thirty feet, and in proportion for any greater length; elm, two inches; white pine, one and a half inches; red pine, two

inches; ash, one and a half inches; basswood, one and a half inches; butternut, one and a half inches. Bends or twists not to exceed one in number.

HOLLOWS ALLOWED.

Oak, three inches for every twenty feet in length, and in proportion for any greater length; elm, three inches; white pine, two and a half inches; red pine, three inches; ash, two and a half inches; basswood, two and a half inches; butternut, two and a half inches.

DIMENSIONS OF WHITE PINE MASTS, BOWSPRITS AND RED PINE SPARS.

White Pine Masts, twenty-three inches and upward at partners, shall be three feet in length to each inch in diameter; twenty-two inches, three feet, and three feet extreme length; twenty-one inches and under, three feet, and three feet extreme length; twenty inches and under, three feet, and four feet extreme length. Hollow or bend not to exceed six inches for seventy feet, and in proportion for any greater length.

BOW SPRITS.

Shall be two feet in length for every inch in diameter at the partners, adding two feet for extreme length.

RED PINE SPARS.

Shall be three feet to the inch in diameter at the partners, and nine feet extreme length; hollow not to exceed seven inches for sixty feet, and in proportion for any greater length.

RE-DRESSING.

In all cases where it appears that timber, masts, spars, boards, planks, deals, staves, oars or any other description of lumber, are not properly hewed, squared, butted or edged, but are merchantable in other respects, and sold as such, the Supervisor and Culler, respectively, shall order or cause the same to be properly dressed and chopped, at the expense of the buyer or seller, as the case may be, previously to their being respectively received and certified to be merchantable, such dressing and chopping to be done under the direction of the Culler in charge of the measuring or culling.

MINNEAPOLIS INSPECTION.

At a meeting of the Lumberman's Board of Trade, held May 25, 1878, the plan for securing uniformity in the sorting of lumber was fully inaugurated, and the grades as nearly determined upon as it is possible to define them by any set of words. Entire harmony of opinion exists among the manufacturers of the city as to the uselessness of some of the grades or kinds which have been put upon the market, and it was unanimously resolved to decrease the number of kinds by striking out several. The committee appointed for the purpose, after fully considering the matter, reported the following list and description of grades:

First Clear.—Shall be not less than twelve inches wide and twelve feet long; shall be free from all imperfections, with no sap, except where over fourteen inches wide; then allow not over one inch on one side.

Second Clear.—Shall be not less than ten inches wide and twelve feet long; defects may be allowed, not to exceed two knots of three-fourths of an inch in diameter, or sap that will be equal to one inch on one side. If the width be sixteen inches or upwards, defects may be allowed equal to three knots of one inch in diameter, or sap equal to three inches the whole length.

Third Clear.—Shall be not less than seven inches wide and twelve feet long; defects, equal to three knots one inch in diameter and sap one and one-half inch wide in boards to twelve inches; and from twelve to sixteen inches wide, knots of two inches in diameter and sap two inches on one side; on boards over sixteen inches, defects may be increased to knots equal to four inches, and to four inches of sap.

Clear Strips.—Shall be six inches wide and full one inch thick; will allow one inch of sap, but no other imperfections.

First Flooring.—May be four, five or six inches wide; allow one inch of sap and three small sound knots, but no other imperfections. These imperfections to apply to six inch flooring and to decrease according to width.

Second Flooring.—Same as first, in width; allow six small knots, and sap equal to one and one-half inch the whole length.

Common Flooring.—Shall be four, five and six inches wide; allow defects equal to eight small knots; sap or shake and split not to exceed two feet in length.

First Siding, Dressed.—Allow one inch sap on thin edge, but no other imperfections.

Second Siding, Dressed.—Allow one inch sap on either edge, and three small knots, but no other imperfections.

Common Siding, Dressed.—Allow sap and defects equal to eight small knots, and shake or split two feet in length.

A Stock.—May be eight to twelve inches wide, twelve to sixteen feet long, and of a quality equal to Third Clear Boards.

B Stock.—Shall be eight, ten and twelve inches wide; shall be sound and square edged; allow from four to eight small, sound knots, or sap not to exceed four inches in width the whole length of the best side.

C Stock.—Shall be eight, ten and twelve inches wide; shall be sound and square edged. Will allow from eight to twelve sound knots, according to width, and will allow Norway.

D Stock.—Shall be eight, ten and twelve inches wide, and of like quality with common boards.

First Fencing.—Shall be four, five and six inches in width; shall be of good, sound character, free from imperfections that so weaken a piece that it cannot be used for substantial fencing purposes.

Second Fencing.—Defective and unsound lumber.

Common Boards.—Shall be seven inches wide and upward, and eight feet long; of good, sound lumber, and free from large, loose knots, and well maunfactured; will allow a little wane or a straight split, when otherwise sound and good.

Common Dimesnion and Timber.—Shall be of sound lumber and well manufactured; shall have no imperfections that will render it unfit for substantial building purposes. Some wane allowed.

Sheathing Boards.—Shall be boards that are unsound in quality, with loose knots, shakes, splits and worm eaten, but of sufficient good quality to make good roofing boards, and to be six inches wide and upwards.

A few yards make a grade called E Stock, in which case the D and C Stocks are made a little better than these rules call for.

HARDWOOD INSPECTION IN BALTIMORE.

The following rules for the inspection of hardwood lumber were adopted by the lumber exchange of Baltimore:

In the inspection of hardwood lumber it is essential that the inspector use his best judgment, based upon the following rules laid down for his guidance:

The standard knot must be a sound one, and not exceeding 1¼ inches in diameter.

Splits are to be considered as defects, and usually reduce the piece to a lower grade.

Mill culls are never regarded as marketable, and any cull which will not work to the use for which the size is applicable, without wasting more than one-half, is a mill cull.

The standard lengths are 12, 14 and 16 feet, but 15 per cent of 10-foot lengths may be allowed.

In black walnut and cherry 10-foot is considered as standard, and 15 per cent of 8-foot lengths may be admitted in the first and second grades.

All badly manufactured lumber should be reduced in grade.

Newels must be inspected with a view of the adaptability of the piece for the intended use, as in many cases it cannot be utilized for other purposes. They shall be cut outside of the heart to square the following sizes: 5, 6, 7, 8, 9, 10 and 12 inches when seasoned. The length must be 4 feet or the multiples thereof.

All rotten, shivered and shaky ends shall be cut off in measurement when the board or plank will make 8, 10, 12 or 14 feet long, clear of the bad end, and be graded in the grade the part will make except culls, which shall be counted full in all cases.

Face cracks in all cases will reduce one grade. If badly face cracked, so that one-half of the board or plank cannot be used without waste, then it shall not be counted.

The inspector in all cases is to keep a separate tally of each size and quality. All boards and plank to be measured and graded on the inferior side.

The standard thickness shall be recognized as 1, 1¼, 1½, 2, 2½, 3,

4 and 5 inches in all classes of hardwoods, and in all cases the board or plank shall be full thickness, parallel in width, square edges and square ends.

All tapering pieces of lumber to be measured one-third the distance from the narrow end when 12 inches and over in width at the center and when less than 12 inches wide at the center, to be measured at the narrow end.

Worm holes are to be considered one of the most serious defects in hardwood lumber.

All inspectors inspecting hardwood under these rules, shall mark the quality upon the lumber so inspected, when required.

Lumber inspectors are required to use due care in handling and marking lumber, so as not to interfere with the use of any part of the stock, by careless handling or marking.

BLACK WALNUT.

Walnut shall be inspected in three grades, firsts, seconds and culls.

Firsts shall not be less than 7 inches wide, and free from defects. At 10 inches wide will admit of defects equal to 2 inches of sap on the edges. Defects may increase with width, but not such as to cause waste when used for first-class work.

Seconds shall not be less than 6 inches wide, and at 6 inches may have one sound knot. Defects may increase proportionately with the width. Sap on the face side shall be measured out.

Culls shall include all lumber not up to the standard of seconds. Mill culls to be excluded from this grade.

POPLAR OR WHITEWOOD.

Inspection grades shall be known as firsts, seconds and culls.

Firsts shall not be less than 10 inches wide and at this width shall be free of all defects, at 12 inches wide, 2 inches of white sap, and at 16 inches wide 4 inches of white sap shall be allowed—proportionate increase of sap to be allowed according to width. In lieu of the sap one standard knot shall be allowed for each 4 inches of sap.

Seconds shall be not less than 6 inches wide, and clear up to 8 inches. Over 8 inches may have two sound knots not exceeding 1¼ inches in diameter, and two inches of white sap. At 10 inches defects equal to 3 inches of white sap, or two sound knots 1¼ inches in diameter. Defects may increase with width, but two-thirds of the entire piece must be suitable for manufacture of first-class work without waste.

Culls shall comprise all widths and sizes not up to standard of second grade. Lumber usually designated as mill culls is not included in this grade.

In poplar marketable thicknesses shall be recognized as ⅝, 1, 1¼, 1½, 2, 2½, 3 and 4 inches; ½, ¾, 1¾, 5 and 6 inches and up are classed as special sizes.

When squared the sizes shall be 3x3, 4x4, 5x5, 6x6, 7x7, 8x8, 9x9, 10x10, etc. All square stuff to be cut clear of the heart, clear in quality, and cut large enough to hold sizes when seasoned.

Such as are not prime shall be graded as No. 2 or culls.

ASH.

The inspection grades shall consist of firsts, seconds and culls.

Firsts shall not be less than 8 inches wide, and free from all defects. Sap shall not be considered a defect if bright and sound.

Seconds shall be not less than 6 inches wide, and at 8 inches may have two standard knots. Defects may increase with the width. Must be free from heart, dry rot, dote and worm holes.

Culls shall include all grades not up to the standard of seconds.

OAK.

Inspection same as ash, excepting timber, in which sound knots, and heart not showing on the outside, shall not be considered defects.

Birch, beech, maple, elm and hickory, same inspection as ash.

In first grade hickory, 6 inches in width and 8 feet in length shall be allowed.

QUARTERED OAK.

Quartered oak shall be inspected as firsts, seconds and culls.

Firsts shall be 5 inches and over wide, and clear of all defects.

Seconds shall be 4 inches and over wide, and will allow one or two standard knots at 6 inches, or a little sound, bright sap. No other defects shall be allowed in this grade, but defects may increase with the width of the piece.

Culls: All not up to the standard of seconds shall be graded as culls.

CHERRY.

Cherry shall be inspected in three grades.

Firsts shall not be less than 6 inches wide, and free from defects. At 10 inches wide will admit of defects equal to 2 inches of sap on the edges. Defects may increase with the width, but not such as to cause waste when used for first-class work. Gum spots are excluded from this grade.

Seconds must be 6 six inches and over wide; will admit of two standard knots; sap on the face side to be measured out. Defects may increase with the width in proportion. A small proportion of small gum spots will be allowed, but in no case shall they be of such a character or quantity as to seriously damage the piece.

Culls shall include all not up to the standard of firsts and seconds.

CHERRY, ASH AND WALNUT COUNTER TOPS

Shall be 12 feet and over long, 17 inches and over wide, 1, 1¼, 1½, and 2 inches thick, and must be clear of all defects.

CHERRY, ASH AND WALNUT STRIPS,

6 inches and under wide, when in separate lots, shall be counted as firsts, seconds and culls.

Firsts shall have one face and two edges clear. Sap on face side of ash, when bright, to be counted.

Seconds will admit of two standard knots or sap, which on face side of cherry and walnut shall be counted out.

Culls: All not up to the standard of seconds shall be designated as culls.

Cherry strips shall be 6 feet and over long.

CINCINNATI HARDWOOD INSPECTION.

Adopted by the Lumbermen's Exchange of the City of Cincinnati, Ohio.

In hardwood inspection the inspector should use his best judgment, based upon the general rules laid down for his guidance. He should inspect all boards and plank on the poorest side. The standard knot is to be considered as not to exceed 1¼ inches in diameter and of sound character. Splits are not to exceed the width of the piece in firsts, and twice the length of the piece in seconds, and not more than 25 per cent can be split.

All lumber shall be sawed thick enough to meet the required thickness when seasoned.

All lumber must be sawed square edged, unless otherwise ordered, and boards or plank having bark or wane must be reduced one grade, and measured inside the bark or wane.

All boards 1 inch and under in thickness shall be measured face measure. If sawed scant 1 inch, shall be reduced to next standard thickness.

All badly manufactured lumber shall be classed as culls. No cull is considered as having a marketable value which will not work one-half its size without waste.

Tapering lumber shall be measured one-third its length from the narrow end.

Lumber sawed for specific purposes must be inspected with a view to the adaptability of the piece for the intended use, as in many cases it cannot be utilized for other purposes.

In the inspection of combined grades of firsts and seconds, an undue predominance of seconds should always be ascertained, as the purchaser is entitled to full average in quality.

Combined firsts and seconds, as a grade, is understood to mean 65 per cent firsts and 35 per cent seconds, unless otherwise stated hereinafter.

Standard lengths are 10, 12, 14 and 16 feet, but shorter than 10 feet does not come within the range of marketable, although sometimes admitted.

In walnut and cherry, 10 per cent of 8-foot lengths may be admitted in firsts and seconds, and 6 feet long in lower grade.

Mill culls are never recognized as marketable, and all culls which will not work without wasting more than one-half is a mill cull, and shall be so reported on certificates.

Table legs, crib posts and chair legs should be cut outside the heart to insure the proper size; hearts in all varieties of lumber are excluded from all grades above culls.

It is important that all lumber should be parallel in width, square edge, and square ends.

Thickness of hardwood shall be recognized 1, 1¼, 1½, 2, 2½, 3, 4, and 5 inches.

Poplar or whitewood, marketable thickness, shall be ⅝, ¾, 1, 1¼, 1½, 2, 2½, 3, and 4 inches.

Worm holes are to be considered one of the most serious defects in lumber.

Measurers and inspectors shall inspect each board or plank full face measure, and in no case shall a board or plank be cut in length or width to raise its grade.

It shall be the duty of each measurer or inspector to ascertain the true and full contents of each and every piece of lumber or stick in each car or lot of lumber measured, and keep a correct piece tally of the same in a plain, legible account in a tally-book, and his certificates of inspection must contain correct report of number of pieces in each grade, and the total number of feet in each grade, and the records of the general inspector, or any of his deputies, shall at all times be open to the inspection of members of this exchange.

All applications for inspection shall be made to the general inspector, and all inspections made by his deputies shall be under his direction.

He shall, by himself or his deputies, inspect and measure all lumber brought into this market for sale, when a request is made therefor by either the purchaser or seller, and he shall enforce all the rules of this exchange.

If a measurer or inspector is guilty of, or connives at, a fraud or deceit in inspecting, marking, or numbering as to contents or quality of any kind of lumber, or if such inspector, when requested by the owner or a dealer in lumber to inspect the same, refuses without good reasons to perform the duty, he shall forfeit for each offense not less than $50 nor more than $100.

If a seller or purchaser of lumber, being a member of this exchange, attempts to induce an inspector to make a false inspection, he shall forfeit for each offense not less than $50 nor more than $100.

WALNUT.

Grades.—Firsts, Seconds, Rejects and Culls.

Firsts and Seconds may be combined in one grade, to be designated firsts and seconds.

The combined grades of firsts and seconds shall consist of 50 per cent of firsts and 50 per cent of seconds, unless otherwise stated.

Standard lengths are 10, 12, 14, and 16 feet, admitting 10 per cent of 8 and 10-foot lengths.

Eight feet lengths, 12 inches and wider, to be clear, and graded as firsts.

Nine to 12 inches wide must be clear, and graded as seconds.

Firsts, or No. 1 grade, shall be 8 inches and over in width, and 12 feet and over in length.

Eight or 11 inches wide must be clear on both sides and free from all defects.

Twelve to 15 inches wide, 10 feet long, will admit of bright sap on one side, not exceeding 1 inch in width, and only on one edge, or one standard knot, showing only on one side, and must be close to the edge or end of the board.

Sixteen to 20 inches wide and over will admit bright sap on one side, not exceeding 2 inches in width, or two standard knots, showing only on one side, and must be near the edge or end of the board.

Checks on ends shall be deemed a defect, and shall not exceed 12 inches in length.

Seconds, or No. 2 grade, are to be 6 inches and over in width, 10 feet and over in length.

Six and 7 inches wide shall be clear.

Eight to 10 inches wide will admit one standard knot, or equal defects.

Eleven to 15 inches wide will admit two standard knots, or equal defects.

Sixteen inches and over wide will admit of three standard knots, or equal defects.

In any width over 8 inches not more than one-fifth of the surface of one side shall be sappy, and the piece shall be without other defects.

Both the above grades must be entirely free from wormy wood, worm holes, wind shakes, dote, or rot.

Rejects are 4 inches and over in width, 8 feet and over in length.

Four and 5 inches must be clear on both sides.

Six to 7 inches wide must be clear on face.

Over 7 inches wide shall include all lumber not equal to a grade of seconds, but available at full three-fourths of its size for use without waste.

Heart boards or planks not admitted; small worm holes on one edge or end of board 8 inches and over wide, with no other defects, such as sap and knots, will be admitted.

Culls shall include any width and all lumber not up to the standard of rejects, in which not less than one-half the piece is fit for use without waste.

All other than as above stated shall be classed as mill culls.

Marketable thickness shall be ½, ¾, 1, 1¼, 1½, 2, 2½, 3 and 4 inches.

CHERRY AND SWEET GUM.

Grades.—Same as Walnut.

Gum spots on cherry shall be deemed a serious defect, and if excessive shall lower the price one or two grades.

POPLAR.—(WHITEWOOD.)

Grades.—Firsts, Seconds, Common, and Culls.

Firsts are to be 10 inches and over in width.

Ten to 12 inches wide shall be clear and sound.

Thirteen to 15 inches wide will admit 1 inch of bright sap showing only on one side.

Sixteen to 20 inches wide will admit 2 inches of bright sap showing only on one side, or one standard knot showing only on one side.

Seconds are to be 8 inches and over in width.

Eight inches wide shall be clear.

Nine to 12 inches wide will admit 2 inches of bright sap, or one standard knot.

Thirteen to 15 inches wide will admit 3 inches of bright sap, or two standard knots.

Sixteen to 20 inches wide will admit 4 inches of bright sap, or three standard knots.

Common is to be 5 inches and over in width; 5 and 6 inches wide shall be clear.

Seven inches and over in width include all lumber not equal to the grade of seconds, two-thirds of each piece being merchantable, or will admit of one-third the surface discolored sap, or all bright sap boards, when otherwise free from defects.

Culls include all lumber not equal to the grade of common, one-half of each piece being merchantable.

Other than as above stated shall be classed as Mill Culls.

OAK.—(PLAIN.)

Grades.—Firsts, Seconds and Culls.

Firsts are to be 10 inches and over in width; 10 to 12 inches shall be clear; 13 to 15 inches wide will admit one standard knot showing only on one side; 16 to 20 inches wide will admit two standard knots showing only on one side; live sap admitted on one side, not to exceed one-tenth of the surface, if without other defects; worm holes not admitted.

Seconds are to be 8 inches and over in width; 8 to 12 inches wide will admit one standard knot; 13 to 15 inches wide will admit two standard knots; 16 inches wide and over will admit three standard knots; live sap admitted on one side, not to exceed one-fifth of the surface, if without other defects.

Culls include all lumber not equal to the grade of seconds, one-half of each piece being merchantable. Other than as above stated shall be classed as Mill Culls.

QUARTERED OAK.

Grades.—Firsts and Seconds.

Firsts are to be 6 inches and over in width; 6 to 9 inches wide shall be clear; 10 inches and over in width will admit one standard knot showing only on one side, or equal defect. (Equal defect means sap or splits.)

Seconds are to be 5 inches and over in width; 6 to 9 inches will admit one standard knot, or sap 1½ inches, or split 10 inches; 10 inches and over in width will admit two standard knots, or 2 to 2½ inches sap, or split 12 inches; 4 to 5 inches wide shall be clear on one side.

Culls same as Walnut. (See Walnut Culls description.)

CHESTNUT AND BUTTERNUT.

Grades.—Same as Oak.

HICKORY.

Shall be classed as boards, plank and axles.

Boards and plank shall be inspected as firsts and seconds in one grade, and must not be less than 4 inches wide; four to 8 inches wide must be clear; eight to 10 inches wide may have one standard knot, or a split not over 10 inches long. Ten to 12 inches may have two standard knots, or a split not over 12 inches long. Twelve to 18 inches may have three to four standard knots, owing to width of board, or splits not to exceed 12 inches at one or both ends. All boards 18 inches and over may have four to five standard knots, or two splits not to exceed 12 inches long. Sap will be admitted in the above grade, but it must be bright, sound and free from defects.

Culls shall include any width, and all lumber not up to the above grades of firsts and seconds, in which not less than one-half the piece will work without waste.

Axles must be clear and of tough timber.

WHITE AND BLACK ASH.

White and black ash should be in lengths of 12, 14 and 16 feet. The usual thicknesses are 1, 1¼, 1½, 2, 2½, 3, 3½, 4 and 5 inches, and is inspected in the market as firsts, seconds and culls.

Firsts must be not less than 8 inches wide, and free from all defects up to 10 inches; when 12 inches and over wide, will admit of one or two small defects, and a split of not over 18 inches will be allowed. If over 18 inches will reduce lumber one grade, and if in each end will reduce it two grades. Sap is not considered a material injury if bright and in good condition.

Seconds must not be less than 6 inches wide; at 6 inches must be free from all defects; at 10 inches may have from one to three standard sound knots. Defects may increase with width of board, must be free from heart, dry rot, dead or doty timber. Defective sawing will reduce a board or plank to the next grade below.

Culls, any width or length, in which not less than one-half is fit for use without waste.

MAPLE, BIRCH AND SYCAMORE.

Grades—Same as ash.

PHILADELPHIA INSPECTION RULES.

Adopted by the Lumber Exchange, of Philadelphia, Pa.

HARDWOOD.

The question of grading and inspecting lumber is so much a matter of judgment to the inspector as each piece comes before him, that no definite and positive rules can be laid down on paper by which any piece or any thousand feet can be inspected.

The variety of defects and their location upon a piece, and their size, have such relations to each other that the inspector necessarily must depend upon his own judgment in grading, guided by the following rules, so far as they will apply practically:—

A standard knot is not to exceed 1¼ inches in diameter, and must be sound.

Worm holes to be excluded in firsts and only admitted in seconds in quantities equal to defects hereinafter described in this quality.

Large and loose knots grade the piece of lumber lower, as the judgment of the inspector thinks proper.

Splits are not to exceed in length the width of the piece in firsts, and twice the length of the width of the piece in seconds, and not more than 25 per cent can be split.

Shakes are not admitted in firsts and seconds.

Tapering lumber shall be measured one-third of its length from the narrow end.

Thickness.—All lumber must be sawed square edged and be full thickness when seasoned.

Lumber sawed for specific purposes, and dimension stock, must conform to the requirements of size and quality for the purposes intended, and be so inspected and measured.

Culls are not marketable unless one-half the surface of the board is free from defects.

Mill culls are not marketable except by special arrangement.

Log run is understood to be the run of the unpicked logs, mill culls out.

Combined firsts and seconds, as a grade, shall have 50 per cent of first quality, unless otherwise stated hereinafter.

Standard lengths are to be 12, 14 and 16 feet, admitting 10 per cent of 8 and 10 feet lengths.

Newels, from all kinds of timber, are to be cut outside the heart and to be clear, to square 5, 6, 7, 8, 9 and 10 inches when seasoned, and to be in lengths of 4 feet or any multiple thereof.

Balusters.—To be cut exactly square, of full size, and clear, and to be 75 per cent 36 inches long; 25 per cent 32 inches long.

WALNUT.

Grades.—Firsts and Seconds, Rejects and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit of bright sap on one side not exceeding one inch in width, or one standard knot, showing only on one side; 16 wide and over will admit of bright sap on one side not exceeding two inches in width, or two standard knots, showing only on one side.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 10 inches will admit of one standard knot; 11 to 15 inches wide will admit of two standard knots; 16 inches wide and over will admit of three standard knots. In any widths not more than one-fifth of the surface of one side may be sappy, but the piece shall be without other defect.

Rejects are to be 4 inches and over in width; 4 and 5 inches wide shall be clear; 6 inches and over in width shall include all lumber not equal to the grade of good seconds, two-thirds of each piece being clear.

Culls are to include all lumber not equal to the grade of good rejects, half of each piece being clear. Other than as above stated shall be classed as Mill Culls.

CHERRY AND BUTTERNUT.

Grades.—Firsts, Seconds, Rejects and Culls.

Firsts are to be 8 inches and over in width; 8 to 10 inches wide shall be clear; 11 to 14 inches wide will admit of bright sap on one side not exceeding one inch in width, or one standard knot showing only on one side; 15 inches wide and over will admit of bright sap on one side not exceeding two inches in width, or two standard knots, showing only on one side.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 10 inches wide will admit of one standard knot; 11 to 14 inches wide will admit of two standard knots; 15 to 20 inches wide will admit of three standard knots. Gum spots in above grades not admitted except where very slight. In any widths not more than one-fifth of the surface of one side may be sappy, but the piece shall be without other defect.

Rejects are to be 4 inches and over in width; 4 and 5 inches wide shall be clear or clear one side; 6 inches and over in width shall include all lumber not equal to the grade of good seconds, two-thirds of each piece being clear.

Culls to include all lumber not equal to the grade of good rejects, one-half of each piece being clear.

Mill Culls.—Other than as above stated shall be classed as Mill Culls.

Strips.—3 to 7 inches wide shall be clear or clear faced; the reverse side will admit of one-half sap or one defect.

OAK.—(PLAIN, WHITE OR RED.)

Grades.—Firsts, Seconds and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit of one standard knot, showing only on one side; 16 inches wide and over will admit of two standard knots, showing only on one side. Live sap admitted on one side, not to exceed 10 per cent of the surface, if without other defects. Must be entirely free from worm holes.

Seconds are to be 6 inches and over in width; 6 and 7 inches are to be clear; 8 to 12 inches wide will admit of one standard knot; 13 to 15 inches wide will admit of two standard knots; 16 inches wide and over will admit of three standard knots. Live sap admitted on one side, not to exceed 20 per cent of the surface, if without other defects. Worm holes are serious defects.

Culls shall include all lumber not equal to the grade of good seconds, one-half of each piece being clear.

Mill Culls.—Other than as above stated shall be classed as Mill Culls.

ASH.

Grades.—Firsts, Seconds, and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit of one standard knot; 16 inches wide and over will admit of two standard knots. Live white sap allowed.

Seconds are to be 6 inches and over in width; 6 to 7 inches wide shall be clear; 8 to 12 inches wide will admit of one standard knot; 13 to 15 inches wide will admit of two standard knots; 16 inches wide and over will admit of three standard knots. Heart or doted boards and plank will not be admitted.

Culls to include all lumber not equal to the grade of good seconds, one-half of each piece being clear.

Mill Culls.—Other than as above stated shall be classed as Mill Culls.

ELM.

Grades.—Firsts, Seconds, and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit of one standard knot; 16 inches wide and over will admit of two standard knots. Live white sap allowed. Must be entirely free from worm holes.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 12 inches wide will admit of one standard knot; 13 to 15 inches wide will admit of two standard knots; 16 inches wide and over will admit of three standard knots. Live white sap allowed. Worm holes are serious defects.

Culls are to include all lumber not equal to the grade of good seconds, one-half of each piece being clear.

Mill Culls.—Other than as above stated shall be classed as Mill Culls.

MAPLE.—(HARD AND SOFT.)

Grades.—Firsts, Seconds, and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit of one standard knot; 16 inches wide and over will admit of two standard knots. Live white sap allowed.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 12 inches wide will admit of one standard knot; 13 to 15 inches wide will admit of two standard knots; 16 inches wide and over will admit of three standard knots. Live white sap allowed. Heart or doted boards and plank will not be admitted.

Culls are to include lumber not equal to the grade of good seconds, one-half of each piece being clear.

Mill Culls.—Other than as above stated shall be classed as Mill Culls.

MAPLE SQUARES.

4 inches by 4 inches to 10 inches by 10 inches square.

Firsts are to be 10 feet and upward in length, clear, sound, and free from all defects, and of full size when seasoned.

Seconds are to be sound and free from hearts, shakes and checks; 10 and 12 feet lengths admit of two standard knots; 14 and 16 feet lengths admit of three standard knots. Bright sap admitted when not exceeding 50 per cent of the surface. These defects are based on 6x6 squares, and are to bear the same on other sizes.

Culls are to include all squares not equal to the grade of good seconds, one-half of each piece being clear.

Mill Culls.—Other than as above stated shall be classed as Mill Culls.

QUARTERED OAK.—(SHALL BE FIGURED.)

Grades.—Firsts and Seconds.

Firsts are to be 6 inches and over in width; 6 to 9 inches wide shall be clear; 10 inches and over in width will admit of one standard knot, showing only on one side, or equal defect.

Seconds are to be 6 inches and over in width; 6 to 9 inches wide will admit of one standard knot showing only on one side, or equal defect; 10 inches and over in width will admit of two standard knots showing only on one side, or equal defect.

Strips 4 and 5 inches wide only accepted by special agreement. Combined grade of firsts and seconds shall contain not less than 75 per cent of firsts.

POPLAR.—(WHITEWOOD.)

Grades.—Firsts, Seconds, and Common.

Firsts are to be 10 inches and over in width; 10 to 12 inches wide must be clear and sound; 13 to 15 inches wide will admit of one inch of bright sap showing only on one side; 16 inches wide and over will admit of two inches of bright sap showing only on one side.

Seconds are to be 8 inches and over in width; 8 inches wide shall be clear; 9 to 12 inches wide will admit of two inches of bright sap on one side, or one standard knot showing only on one side; 13 to 15 inches wide will admit of three inches of bright sap on one side, or two standard knots showing only on one side; 16 inches and over wide will admit of four inches of bright sap on one side, or three standard knots showing only on one side. Stained sap considered a serious defect.

Common, to be all lumber not equal to above grades, excluding Mill Culls.

Mill Culls.—Other than as above stated to be classed as Mill Culls.

POPLAR SQUARES

4 inches by 4 inches to 10 inches by 10 inches square.

Firsts are to be 10 feet and upward in length, sound and free from all defects, sawed square, and full size when seasoned.

Seconds are to be sound and free from hearts, shakes and checks; 10 and 12 feet lengths admit of two standard knots and two inches of bright sap on two corners; 14 and 16 foot lengths admit of three standard knots and two inches of bright sap on two corners. These defects are based on 6x6 squares, and bear the same ratio in other sizes.

Culls include all squares not equal to the grade of good seconds, one-half being clear.

Mill Culls.—Other than above stated shall be classed as Mill Culls.

BIRCH AND BEECH.

Grades.—Firsts, Seconds, and Culls.

Firsts are to be 8 inches and over in width; 8 to 10 inches wide shall be clear; 11 to 14 inches wide will admit of one standard knot, showing only on one side; 15 to 20 inches wide will admit of two standard knots, showing only on one side.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 10 inches wide will admit of one standard knot; 11 to 14 inches wide will admit of two standard knots; 15 to 20 inches wide will admit of three standard knots.

Culls to include all lumber not equal to grade of good rejects, half of each piece being clear.

Mill Culls.—Other than as above stated shall be classed as Mill Culls.

CHESTNUT.

Grades.—Firsts, Seconds, and Culls.

Firsts are to be 8 inches and over in width; 8 to 15 inches wide shall be clear; 16 inches wide and over will admit of one standard knot.

Seconds are to be 6 inches and over in width; 8 to 12 inches wide will admit of one standard knot; 13 to 15 inches wide will admit of two standard knots; 16 inches wide and over will admit of three standard knots. Worm holes in above grades not admitted, except when in a bunch not larger than the standard knot or knots, as provided for the width of board in which they appear.

Culls to include all lumber not equal to the grade of good seconds, one-half of each piece being clear.

Mill Culls.—Other than as above described shall be classed as Mill Culls.

GUM AND SYCAMORE.

Grades.—Firsts, Seconds, Rejects, and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit of bright sap on one side not exceeding one inch in width, or one standard knot, showing only on one side; 16 inches wide and over will admit of bright sap on one side not exceeding two inches in width, or two standard knots, showing only on one side.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 12 inches wide will admit of one standard knot; 13 to 15 inches wide will admit of two standard knots; 16 inches wide and over will admit of three standard knots. In any widths, not

more than one-fifth of the surface of one side may be sappy, but the piece shall be without other defect.

Rejects are to be 4 inches and over in width; 4 and 5 inches wide shall be clear; 6 inches and over in width shall include all lumber not equal to the grade of good seconds, two-thirds of each piece being clear.

Culls are to include all lumber not equal to the grade of good rejects, one-half of each piece being clear.

Mill Culls.—Other than as above stated shall be classed as Mill Culls.

COTTONWOOD.

Grades.—Firsts, Seconds, and Culls.

Firsts to be 8 inches and over in width; 8 to 12 inches wide must be clear; 13 to 15 inches wide will admit of two inches of bright sap on one side, or one standard knot showing only on one side; 16 inches wide and over admit of three inches of bright sap on one side, or two standard knots showing only on one side.

Seconds to be 6 inches and over in width; 6 and 7 inches wide must be clear; 8 to 12 inches wide will admit of two inches of bright sap on one side, or one standard knot showing only on one side; 13 to 15 inches will admit of three inches of bright sap on one side, or two standard knots showing only on one side; 16 inches wide and over will admit of four inches of bright sap on one side, or three standard knots showing only on one side.

Culls to be all the lumber not equal to the grade of good seconds, one-half of each piece being clear.

Mill Culls.—Other than as above stated shall be classed as Mill Culls.

BASSWOOD.

Grades.—Firsts, Seconds, and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear of knots; 13 to 15 inches wide will admit one standard knot showing only on one side; 16 inches wide and over will admit of two standard knots showing only on one side.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear of knots; 8 to 12 inches will admit of one standard knot showing only on one side; 13 to 15 inches wide will admit of two standard knots showing only on one side; 16 inches wide and over will admit of three standard knots showing only on one side.

Culls to include all the lumber not equal to the grade of good seconds, one-half the piece being clear.

Mill Culls.—Other than above stated shall be classed as Mill Culls.

QUARTERED SYCAMORE.—(SHALL BE FIGURED.)

Same as Quartered Oak, except as to sap, all sap—culls. Grades.—Firsts and Seconds.

Firsts are to be 6 inches and over in width; 6 to 9 inches wide shall be clear; 10 inches and over wide will admit of one standard knot showing only on one side, or equal defect.

Seconds are to be 6 inches and over in width; 6 to 9 inches wide will admit of one standard knot showing only on one side, or equal defect; 10 inches and over in width will admit of two standard knots showing only on one side, or equal defect.

Strips 4 and 5 inches wide only accepted by special agreement.

HICKORY.

Grades.—Firsts, Seconds, and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit of one standard knot showing only on one side; 16 inches wide or over will admit of two standard knots showing only on one side.

Seconds are to be 6 inches and over in width; 6 to 7 inches shall be clear; 8 to 12 inches wide will admit of one standard knot; 13 to 15 inches wide will admit of two standard knots; 16 inches wide and over will admit of three standard knots.

Culls include all lumber not equal to the grade of good seconds, one-half of each piece being clear.

Mill Culls.—Other than above stated shall be classed as Mill Culls.

SECOND GROWTH HICKORY.

Sawed through and through and rough edged. Shall be measured inside the wane, and the average width of the face.

WHITE PINE LUMBER.

First Clear shall not be less than 13 inches in width and 12 feet in length—must be perfect up to 14 inches—on that width sap shall be allowed equal to one inch, the whole length of the piece on one side, but the face must be perfect -over that width imperfections shall be allowed in proportion to the width based on the description of a 14-inch piece.

Second Clear shall not be less than 11 inches in width and 12 feet in length—must be perfect up to 12 inches in width—at that width sap shall be allowed equal to one inch, the whole length of the piece on one side—over that width imperfections shall be allowed in proportion to the width based on the description of a 12 inch piece.

Third Clear shall not be less than 10 inches in width and 12 feet in length—must be perfect up to 11 inches in width—at that width

sap shall be allowed equal to one inch, the whole length of the piece on one side—over that width imperfections shall be allowed in proportion to the width based on the description of an 11-inch piece.

Selects shall not be less than 9 inches in width and 12 feet in length—must be perfect up to 10 inches in width—at that width sap shall be allowed equal to one inch in width on both edges on one side—over that width imperfections shall be allowed in proportion to the width based on the description of a 10-inch piece.

Fine Common shall not be less than 8 inches in width and 12 feet in length—at that width shall have one clear face—9 inches and over in width shall admit of some knots, and less sap in proportion to the width. This grade makes good one side lumber, and in general knots shall be allowed, so that this grade is not injured for finishing purposes.

No. 1 Shelving shall be 12 inches and over in width and not less than 12 feet in length, with clear edges and a few small tight knots.

No. 2 Shelving or Dressing shall be 10 inches and over in width and not less than 12 feet in length—with clear edges and medium sized sound knots.

No. 1 Cuts shall be 9 inches and over in width, with 75 per cent of good lumber in the piece.

No. 2 Cuts shall be 8 inches and over in width, with about 60 per cent of good lumber in the piece—this grade will admit of some shake.

No. 1 Molding shall be 6 inches and over in width and not less than 12 feet in length, straight grained, with one clear heart face—will admit of slight discoloration of sap on the back.

No. 2 Molding when under 6 inches in width, shall have one clear heart face—when 6 inches and over in width, will admit of a few small sound knots or sap on face, not over one-third the width of the piece.

Case Boards shall be 16 inches and over in width and not less than 12 feet in length—free from split, rot, shake and loose knots.

Barn Quality shall be 8 inches and over in width and not less than 12 feet in length—free from split, rot, shake, and unsound knots.

It is understood that all the above grades shall be full thickness and well manufactured.

Culls shall be 6 inches and over in width, of a generally unsound character, and when the imperfections are too great for the ordinary purposes of barn quality.

Mill Culls.—All lumber below culls, not actually worthless.

DRESSED LUMBER.

Six-inch Clear Fencing shall not be less than 12 feet in length, ⅞ of an inch in thickness and 5⅝ inch face, and shall be perfect.

Six-inch No. 1 Fencing shall be of the same dimensions as clear fencing, and will admit of one small knot, or sap ¾ inch in width the full length of the piece, with perfect face.

Six-inch No. 2 Fencing shall be of the same dimensions as clear fencing, and admit of a few small, sound knots, with sap one inch the full length of the piece on one side—if fewer knots, more sap is allowed.

Six-inch No. 3 Fencing shall be of the same dimensions as clear fencing, free from rot, or large, unsound knots; slight shakes will be admitted if without other imperfections.

Six-inch No. 4 Fencing shall be of the same dimensions as clear fencing—rougher than No. 3 grade, but not so unsound that it cannot be used for its intended purpose.

Promiscuous Width Fencing.—In promiscuous fencing the quality shall be the same as above grades, and the face shall be the full width represented.

GERMAN SIDING, BASE BOARDS, CEILING (OR ONE SIDE FENCING) AND FLOORING.

Six-inch Clear shall not be less than 12 feet in length, ⅞ inch in thickness, and 5¾ inches in width—and shall be perfect on the face.

Six-inch No. 1 shall be the same dimensions as clear, and will admit of one small knot, or sap ¾ inch in width the full length of the piece on the face.

Six-inch No. 2 shall be of the same dimensions as clear, and will admit of a few small, light knots, and one inch of sap the full length of the piece. If less knots, more sap is allowed in proportion.

Six-inch No. 3 shall be of the same dimensions as clear, and shall be free from shake, rot or large, unsound knots.

BEVEL SIDING.

Clear shall not be less than 12 feet in length and 5⅝ inches in width, and must be perfect on face side.

No. 1 shall be the same dimensions as clear, and will admit of one small knot, or one-half inch of bright sap the full length of the piece on face side.

No. 2 shall be the same dimensions as clear, and will admit of two or three small knots, or one inch of bright sap the full length of the piece on face side.

No. 3 shall be the same dimensions as clear, and will admit of four or five small knots, or two inches of bright sap the full length of the piece on face side.

No. 4 shall be the same dimensions as clear, and will admit of larger knots than the No. 3 grade—will also allow fine shake.

PLASTERING LATH.

No. 1 shall be 4 feet in length, not less than ⅜ of an inch in thickness, 1⅜ inches in width, free from rot, wane or worm holes.

WHITE PINE SCANTLING.

Shall be from 2x3 to 8x8 in dimensions, well manufactured, and shall be principally 16 feet long; quality shall be small sound knots.

WHITE PINE TIMBER.

Shall be square edges, straight grained, free from large or loose knots, or other imperfections that will materially injure the strength of the piece.

WHITE PINE PALES.

No. 1 shall be clear of knots, wane, and black sap, not less than ⅞ of an inch in thickness, and 2½ inches in width.

No. 2 shall be the same dimensions as No. 1, and will admit of sap and sound knots.

SPRUCE.

Grades.—Merchantable and culls. Merchantable boards shall be free from shakes and loose or unsound knots. All shaky boards with loose and unsound knots shall be inspected as culls.

Merchantable Scantling, plank and joists shall also be sound in character and free from cross grain that will affect the strength of the piece, and will admit of wane not to exceed one-quarter the length of the piece and one-third the thickness on one edge. A cull shall be a piece not included in the merchantable.

Pickets shall be either 4, 4½ or 5 feet in length, ¾, ⅞ or 1 inch thick, and 3 inches in width.

Plastering Lath shall be sound and well manufactured, and standard size; shall be 4 feet in length and 1⅜x5-16 inches, and 100 in a bundle.

HEMLOCK.

The inspection of hemlock shall be as follows:

Boards and shingles shall consist of three grades—mill culls, culls and good.

A Mill Cull shall consist of a board that is rotten, very badly shaken, that contains the shape but not the substance, which is not altogether worthless, but is used for some certain purposes, at a low price.

A Cull Board shall consist of a board having a few loose knots or knot holes, not over size of 50-cent piece, or shaken equal to one-half the board, or streaky rots, or split half the length of the board.

Good shall consist of all boards better than culls.

All boards above mill culls shall be known as log run, mill culls out, and all boards above culls shall be known as log run, culls out.

Scantling shall consist of 2x3, 2x4 and 3x4, and shall be of two grades—good and culls.

A Good Piece shall be well manufactured, may admit of wane one-quarter (¼) the length of the pieces one-half the thickness on one edge, except 2x3, which must be square to the end, with balance otherwise good, and no other defects that would materially injure the strength of the piece.

A Cull shall be a piece which is not included in the good.

Joists shall consist of two grades—culls and good.

Cull Joists shall consist of all pieces that are doted, badly shaken, very cross-grained, and such as are warped out of shape, provided that large knots or that one or two straight splits in either end of the joist shall not be construed to make it a cull, unless it reduces the strength of the piece. Wanes shall not condemn a piece unless over two-thirds (⅔) the length and and one-half (½) the thickness of piece.

Good Joists shall be well-manufactured, and shall consist of all pieces above culls.

Shingling, Lath, Pickets and Pales shall be well made, parallel widths, and sawed from sound timber.

Plastering Lath shall be well-manufactured, from sound timber, and standard size shall be 1½ inch x 5-16, and three or four feet long.

Bill Lumber shall consist of sizes thicker than three inches, and shall be well manufactured, of full size, as designated in the bill, and the inspection shall be the same as for good joists, except that no wane be allowed that will destroy the strength of the piece.

YELLOW PINE.

All lumber of merchantable quality must be sound, square-edged and square-butted, 12-feet and over in length. Scantling to average 25 feet in length, unless otherwise ordered. And all to be well manufactured, and full to size.

Merchantable Edge Boards.—Must be either 1 or 1¼-inch thick, 3-inch and over in width, free from loose or unsound knots or knots over 1¼-inch in diameter; also free from rot, shake, turpentine deposit, or worm holes, and one face free from discolored sap that will not plane off bright when worked in flooring. If sawed tapering to be measured at narrowest part.

Common Edge Boards.—All rough, thin and stained boards, not up to the grade of merchantable, shall be called common, and must be 10 feet and over in length, and either full ¾, 1 or 1¼-inch thick, and better than a worthless or mill cull board.

No. 1 Heart Face Boards.—Must be 1 or 1¼-inch thick, 3 inches and over wide, and free from knots and all other imperfections on the face side, and sound on the opposite side.

No. 2 Heart Face Boards.—Must be 1 or 1¼-inch thick, 3 inches and over in width, and free from rot, shake, and unsound or loose knots. On boards under 6 inches wide, bright sap shall be allowed on the face or best side of ½-inch on one edge. Boards 6 inches and over wide, may have bright sap on both edges of the face side not to exceed ½-inch in width. Knots shall be allowed on the heart face side, viz.: On boards 6 inches and under wide and 16 feet long and under, one knot of not over 1-inch in diameter; over 16 feet long, and same width, 2 knots of same description. Boards over 6 inches wide and 16 feet long and under, 3 knots not over ½-inch in diameter, and same, over 16 feet long, number of knots may increase in proportion as the length of the board increases.

All boards not up to grade of No. 1 or No. 2 heart face, shall be inspected as "Merchantable" and "Common" edge boards.

Heart.—All boards shall be manufactured parallel widths, and so counted.

No. 1 Step Boards and Plank.—Must be either 1, 1¼, 1½ or 2 inches thick, and 10½ to 14 inches wide, (80 per cent 12 inches and over). One face and one edge entirely free from all imperfections and sound on opposite face.

No. 2 Step Heart Boards and Plank.—Must be 1, 1¼, 1½ or 2 inches thick, allowing ½-inch of sap on one corner of the face side, and one knot not exceeding 1-inch in diameter to every 4 feet in length. To be free from rot, shake and split same widths as No. 1.

In the measurement of side and edge boards, heart face boards, and step boards and plank, the fraction of a foot in contents shall not be counted, and in heart face boards, they shall be counted whole and half inches only in width, viz.: 3, 3½, 4, 4½, 5, 5½, etc.

Merchantable Plank.—1¼, 1½ and 2 inches thick, 6 inches and over in width. Plank 10 inches and under in width, shall show one heart face and two-thirds heart the entire length on the opposite face. Over 10 inches wide, 1-inch of sap shall be allowed on each corner of heart free for not exceeding 4 feet in length. The other side shall show not less than one-half heart the entire length. Lumber to be

sound, and free from knots more than 2 inches in diameter; also free from rot and through shake or splits which are over 4 feet in length.

Merchantable Scantling.—Sizes 2x3 and over. All sizes from 2x3 to 6x8, viz.: 2x3 and 4, 3x4 to 8, 4x4 to 8, 5x5 to 8 and 6x6 to 8 shall show three corners heart, and sizes 5x5 and under to have no knots over 1½-inch in diameter. Over 5x5 up to 6x8, knots not exceeding 2 inches in diameter. All sizes from 3x8, 4x8, 5x8 and 6x8 and over up to 14 inches, to be inspected the same as lumber designated as plank.

Square Sizes, viz.: 7x7, 8x8, 9x9. Sap shall be allowed on all corners, but not to exceed 1½-inch on any one corner. Other square sizes, 10x10 and over shall show two-thirds heart on all sides. Other sizes over 8x8, where the width exceeds the thickness, viz.: 8x10, 8x12, 10x12, etc., shall show at least two-thirds heart on widest face and show heart the entire length on the narrow face.

All merchantable scantling shall be free from through or round shake, rot or knots that impair the strength of the piece.

Any piece of scantling or plank not up to size intended, shall be counted as next lower size or thickness, and all such lumber not up to the grade of merchantable, shall be counted and kept separate, and held subject to order of seller on payment of all expenses incurred on said lumber, unless price is mutually agreed upon at time of purchase.

In scantling, fractions of a foot in length shall not be counted except when ordered to be specified lengths, in feet and inches.

VIRGINIA AND NORTH CAROLINA LUMBER.

Adopted by the Lumbermen's Exchange of Philadelphia for adoption.

All lumber of merchantable quality must be sound, square edged, and parallel widths, 12 feet and over in length, and all to be well manufactured and full to size.

No. 1.—Sap Flooring Quality, shall be 1, 1¼ or 1½ inches in thickness, 6 inches and over in width, clear of sap stain, and other imperfections on face side, and sound on the opposite side.

No. 2.—Sap Flooring Quality, shall be 1, 1¼ or 1½ inches in thickness, 3 inches and over in width, shall be perfect on the face side up to 6 inches in width; 6 inches and over shall admit of a few sound knots and slight discoloration from stain, and sound on the opposite side.

Sap Pine, Rough Quality, shall be 1, 1¼ or 1½ inches in thickness, 3 inches and over in width, and shall include all boards which are sound in quality and not specified in above grades.

All Boards less than 1 inch and not less than ¾-inch in thickness, in No. 1 and No. 2 flooring quality, shall be counted as rough. The same thickness in rough shall be counted as thin.

No. 1.—Heart Step Boards and Plank, shall be 1 and 1¼ inches in thickness, 10½ inches and over in width, and 1½ and 2 inches in thickness, 12 inches and over in width. One face and one edge must be perfect, and sound on the opposite side.

No. 2.—Heart Step Boards and Plank, shall be the same dimensions as No. 1, and will admit of one inch of sap on one edge of face side and one sound, tight knot—not exceeding 1 inch in diameter, to every four feet in length. Free from rot, shake, split and turpentine deposit.

Heart Flooring Grade, shall be 1, 1¼, 1½ and 2 inches in thickness, and shall consist of all boards and plank equal in quality to No. 1 stepping, and less than 10½ inches in width, over that width and over will admit of a few small knots or 1 inch of sap on each edge.

Rough Heart, shall be 1, 1¼, 1½ and 2 inches in thickness and of same grade as specified in rough quality sap pine.

All boards and plank below the grades above specified shall be inspected as culls.

North Carolina and Virginia Heart Scantling and Plank, from 3x4 to 3x12, and 4x4 to 4x12, shall be heart on face side and ¾ heart on opposite side, and will admit of sound knots that will not impair the strength of the piece; 5x5 and upward will admit of 1 inch of sap on each corner and of sound quality. All the above sizes shall be free from through or round shake, rot, or unsound knots.

All Scantling and Plank inferior to above quality shall be counted as culls.

Any piece of Scantling or Plank, not up to size intended shall be counted as the next lower size or thickness.

LOUISVILLE HARDWOOD INSPECTION RULES.

Adopted by the Lumberman's Exchange of Louisville, Ky.

[It should be remembered that, except as to merely local trade, all local inspections of poplar, in the poplar producing districts, were intended to be superseded by the rules of the Poplar Manufacturers and Wholesale Dealers Association, adopted at Cincinnati, Ohio, May 15, 1888.]

INSTRUCTIONS.

It is impossible to make rules that will govern every piece of lumber, there being no two pieces of lumber exactly alike; it is therefore expected that the inspector shall be a person of experience, and use his best judgment—based upon the general rules given; making no allowance for the purpose of raising or lowering the grades of a piece.

The inspector must not favor either the buyer or seller, but take lumber as he finds it, and pass upon each piece, the grade to which it belongs. Inspectors should examine all lumber on the poorest side, excepting flooring. All lumber must be measured in even lengths, excepting stock that is cut to order, for special purposes, when it shall be measured for the full contents. Bark or waney pieces shall be measured inside the bark or wane. All tapering pieces will be measured one-third the length of the piece from the small end.

All badly cut or mis-sawed lumber shall be classed as cull, or placed one grade below what it would be, if properly manufactured. All lumber shall be sawed thick enough to meet the required thickness when seasoned. Lumber sawed for newels, columns, balusters, axles or other specific purposes, must be inspected with a view of the intended use of the piece, and the adaptability for that purpose, as in most of cases it cannot be utilized for other purposes. In the inspection of the combined grade of first and seconds, it will be the duty of the inspector to see that an undue amount of seconds does not appear. Heart pieces are excluded from all grades above cull. Worm holes are considered one of the most serious defects. Gum spots in cherry is a defect, and if excessive, will lower the piece one or two grades. Warped, twisted, flood-stained, stick-rotten lumber shall either be classed as cull, or mill cull and refuse.

The standard lengths of poplar to be 12, 14 and 16 feet, admitting 10 per cent of 10 foot length; walnut and cherry, 10, 12, 14 and 16 foot lengths, admitting 10 per cent of 8 feet; 8 feet to be admitted as No. 1, must be 12 inches wide and upwards; to grade as No. 2, 8 inches wide and upwards.

A standard knot must not exceed 1¼ inches diameter, and must be sound. Log run shall be the unpicked run of the log, mill cull out.

Lumber sold on grade, and without special contract, will be measured according to these rules. The inspector will be required to keep a correct copy of all measurements, and give duplicate of same to both buyer and seller.

BLACK WALNUT.

Combined grade of ***firsts and seconds,*** rejects and shipping culls, No. 1, from 8 to 10 inches, shall be clear of all defects; 10 to 16 inches wide may have 1½ inches bright sap, or 1 standard knot; 16 inches wide and upward may have 2 inches bright sap, or 2 standard knots, showing on one side only.

Seconds—Six inches wide and upward must be clear of all defects at 7 inches; at 10 inches will admit of 1½ inches sap, or 2 standard knots; 10 to 16 inches wide will admit of 2 inches sap or 2 standard knots; 16 inches wide and upward may have 3-inch sap, or 3 standard knots; 12 inches wide and upward will admit of a split, if straight, one-sixth the length of the piece, provided the piece be equal to No. 1 in other respects. Not over 10 per cent of seconds will be taken with splits of the above character.

Reject—Five inches wide and upward, at 7 inches may have 1 inch sap or 1 standard knot; 7 to 12 inches wide may have 2 inches sap or 2 sound knots; 12 to 18 inches wide may have 4 inches sap or 4 sound knots; above 18 inches may have 5 inches bright, sound sap.

Shipping cull will include all lumber not equal to the above that will average and work ⅔ its width and length.

CHERRY AND BUTTERNUT.

Will be graded and inspected according to the rules given for black walnut, with the exception of gum specks in cherry.

POPLAR.

Will include the combined grade of firsts and seconds—No. 1 common, No. 2 common, or shipping cull. The combined grade of firsts and seconds shall not be less than 65 per cent of No. 1. No. 1 shall be 10 inches wide and upward and clear of all defects at 12 inches; 12 to 15 inches may have 1½ inches bright sap, or 1 standard knot—showing on one side only; 15 to 18 inches may have 2 inches sap; 18 inches and upward may have 3 inches sap or 2 standard knots, showing on one side only.

Seconds.—8 inches wide and upward, clear of all defects at 9 inches, at 10 inches wide may have 1 standard knot or a split not over 12 inches long; 15 to 18 inches wide may have 2 standard knots, or 3 inches bright sap; 18 to 22 inches may have 3 standard knots or 4 inches bright, sound sap.

No. 1 Common.—Shall be 6 inches wide and upward, bright, sound and clear sap, not a defect in this grade, 8 to 12 inches wide may have 3 standard knots, 12 to 16 inches wide, 4 standard knots, 16 to 24 inches, 5 standard knots, or may have straight heart crack not showing over one-fourth the length of the piece, if it have no other defect excepting bright sap.

No. 2 Common or Shipping Cull.—Will include lumber with more defects than the No. 1 common. Pieces will be counted where two-thirds of the piece will be available to use for rough manufacturing purposes, stained sap or other defects will be counted in this grade, doted and rotten sap, and other lumber than as above named, will be classed as mill cull or refuse, and have no standard value.

Six-inch Weatherboard Strips.—Should be cut full width, and full 1⅛ inches thick. No. 1 must be clear of all defects. No. 2 may have 1¼ inches bright, sound sap, showing on one side only, or 2 standard knots.

RED GUM.

Will be inspected according to the rules governing poplar, with the exception of sap on the firsts and seconds, 2 inches sap being the extreme width allowed on pieces 18 inches wide and upward, a proportionate amount being allowed on pieces running from that down to 10 inches.

ASH, BEECH, COTTONWOOD, SUGAR MAPLE, SOFT, OR WATER MAPLE, SYCAMORE AND CHESTNUT.

Will be inspected according to rules governing poplar—with the exception of bright and sound sap, which will not be considered a defect.

PLAIN OAK.

Firsts.—8 inches wide and upward, shall be clear at 12 inches; 13 to 15 inches wide will admit of 1 standard knot; 16 to 20 inches wide will admit of 2 standard knots, showing on one side only, or two inches sound sap.

Seconds.—Eight inches wide and upwards; 8 to 12 inches wide will admit of 2 standard knots; 13 to 16 inches wide will admit of 3 standard knots; 15 to 18 inches will admit of 3 inches bright, sound sap. Cull and common oak will be inspected according to rules governing poplar.

Quartered Oak.—Firsts and seconds: Firsts to be 6 inches and over

in width, must be clear at 8 inches; 8 to 12 inches will admit of 1 standard knot, showing only 1 side, or an equal defect. Seconds: 5 inches and over in width, 5 to 9 inches will admit of 1 standard knot or equal defect; 9 to 12 inches wide will admit of 2 standard knots, or equal defect.

HICKORY.

Inspection, same as oak, excepting that bright, sound sap is not to be considered a defect, and first and seconds to be 6 inches wide and upward.

RED ELM.

Firsts and Seconds will be inspected according to rules given for oak.

PENSACOLA PITCH PINE CLASSIFICATON.

Re-sawn Lumber, Sawn and Hewn Timber. Adopted by the Pensacola Lumber and Timber Exchange. In effect August 1, 1887.

DEALS.

Classes.—Prime, Standard Rio, Merchantable and Stowage.

Sizes.—3 inches to 6 inches x 9 inches and up.

Prime.—Must be square edge, one heart face, two-thirds heart surface on other face, to show heart the entire length, free from injurious shakes and through splits, and knots exceeding 2 inches in diameter.

Standard Rio.—Must be square edge, one heart face, two-thirds heart surface on other face, to show heart the entire length, free from from injurious shakes and through splits. Lengths 14 feet and up.

Merchantable.—Must be square edge, one heart face, and show heart on other face, free from through shakes and through splits.

Stowage.—Must be square edge, free from through shakes and through splits.

SCANTLING.

Classes.—Prime and Merchantable.

Sizes.—2 inches to 9¾ inches x 2 inches and up, except sizes included under deals and plank; provided, that deals 4½ inches and up thick, when included in bills of scantling or dimension stuff, may be inspected as scantling.

Prime.—Must be one face all heart, one face all heart two-thirds of the length, the other third of that face two-thirds heart at every

point, and one other face to show heart, free from through splits and through shakes and injurious knots; provided that sizes 7 inches and up x 7 inches and up, instead of heart as above stated, may have two-thirds heart surface on each face, showing heart the entire length.

Merchantable.—Must be square edge, show heart on two faces the entire length, free from through shakes and through splits.

DIMENSION STUFF.

Classes.—Prime and Merchantable.

Sizes.—10 inches and up x 10 inches and up.

Prime.—Must be square edge, two-thirds heart surface on each face, showing heart the entire length, free from injurious shakes and through splits.

Merchantable.—Must show heart on each face, may show wane on two corners not exceeding 15 inches long to each 12 feet in length, 1 inch wide on 10x10, and wider in proportion on larger sizes, free from injurious shakes and through splits.

PLANK AND BOARDS.

Classes.—Stepping, Prime and Merchantable.

Sizes.—1 inch to 2¾ inches x 7 inches and up.

Stepping.—Must be square edge, one heart face, the other face two-thirds heart surface, to show heart the entire length; provided, that where one edge is sap the edge at the opposite point must be heart; to be entirely free from shakes and splits, not to have more than 2 knots ½ inch in diameter, or one knot ¾ of an inch in diameter, to each 12 feet in length. Provided that 50 per cent shall be clear of knots.

Prime.—Must be square edge, one heart face, two-thirds heart surface on other face, to show heart the entire length, free from through shakes and through splits, not to have more than 2 knots 1¼ inches in diameter in sizes under 1½ inches thick, or 2 knots 1½ inches in diameter in sizes 1½ inches and up thick, to each 12 feet in length.

Merchantable.—Must be square edge, one heart face, and show heart on other face, free from through shakes and through splits. Provided that sizes 11 inches and up wide may show sap on one edge of best face not exceeding 1½ inches wide at any one place.

FLOORING.

Classes.—Boston, Prime and Merchantable.

Sizes.—1 inch, 1¼ inches and 1½ inches x 3 inches to 6 inches.

Boston.—Must be square edge, all heart with exception of small streaks of sap on one side not exceeding 2 inches wide at any one point, free from shakes and splits, not to have more than 2 knots ½

inch in diameter, or one knot ¾ of an inch in diameter to each 12 feet in length. Provided that 70 per cent shall be clear of knots.

Prime.—Must be square edge, one heart face, and show heart the entire length on other face, free from splits and shakes, not to have more than two knots ¾ of an inch in diameter, or one knot 1 inch in diameter, to each 12 feet in length.

Merchantable.—Must be square edge, one heart face, with exception of half inch sap on one edge of best face, free from splits and through shakes and knots exceeding 1¼ inches in diameter.

SIDINGS.

Classes.—Prime, Merchantable and Sap.

Sizes.—1 inch and 1¼ inches x 3 inches and up, 3 inches to 6 inches wide being designated as narrow, and 7 inches and up as wide.

Prime.—Must be square edge, one heart face, and same allowance for knots as Merchantable, free from splits and through shakes.

Merchantable.—Must be square edge, sap shall be allowed on best face regardless of sap on other face, as follows: In narrow sidings ½ inch sap shall be allowed on one edge of best face, and in wide sidings half inch sap on each edge of best face, free from through shakes and through splits, with following allowance for knots: In narrow sidings 2 knots 1 inch in diameter, or 3 knots half inch in diameter, to each 12 feet in length, and in wide sidings 2 knots 1½ inches in diameter, or 3 knots ¾ of an inch in diameter, to each 12 feet in length. Provided that 60 per cent shall be clear of knots.

Sap.—Must be square edge, free from through shakes and through splits, and same allowance for knots as Merchantable.

All lumber must be sound, evenly sawn, square butted with saw, free from unsound, loose and hollow knots. The limitation as to size and number of knots refers to the best face. The distribution of knots need not be proportionate, i. e., 2 knots to each 12 feet means that a piece 24 feet long may have 4 knots anywhere in the piece, and not 2 knots to each separate 12 feet.

The allowance for knots in flooring, plank and boards is for the narrowest width of each division; the number may be increased in proportion to the width. In stepping, flooring and sidings, sound knots one-fourth the diameter of the maximum knot, and in prime plank and boards, one-half the diameter of the maximum knot, shall not be considered. In measurement of knots the average diameter must be taken. Unless otherwise specified, lumber shall be 12 feet and up long. The term Re-sawn Lumber shall include all of the sizes above mentioned. The general distinction between sawn tim-

ber and dimension stuff is that dimension stuff is generally bought and sold by the thousand superficial feet, and is usually a part of a schedule including several other kinds of Re-sawn Lumber. Sawn timber generally is bought and sold by the cubic foot, the price being based on the cubic average, and is generally shipped in cargo lots or as a part of a cargo of Hewn Timber or deals.

SAWN TIMBER.

Classes.—"A." and "B."

Class "A."—Must be sound, square butted with saw, square edge and well made, free from injurious shakes and unsound knots, showing heart the entire length on two faces, and showing heart on the other two faces.

Class "B."—Must be sound, square butted with saw, and well made, free from injurious shakes and unsound knots, showing heart on each face, may have slight places of wane not exceeding one inch across in the widest place by not exceeding one-third the length of the piece in the aggregate, and not exceeding two inches across in the widest place by not exceeding three feet in length, and the total number of such places of wane not to exceed one, as above mentioned, on any one corner.

HEWN TIMBER.

Classes.—"A. 2," "B. 1. Good" and "B. 1."

"A. 2."—Must be sound, straight, well manufactured, free from unsound knots and injurious shakes, to show heart the entire length on all sides, may taper 1 inch to 20 feet in length, and may show places of wane one and one-half inches in width and not to exceed six feet in length at top end.

"B. 1. Good."—May have one inch sweep to each 20 feet in length one way only, on not exceeding 15 per cent of the number of pieces in any one raft, must be sound, well manufactured, free from unsound knots and injurious shakes, to show heart on two sides the entire length, and on other two sides ⅔ of the length, may taper 1 inch to 20 feet in length, and may show places of wane 2 inches in width, and not to exceed ten feet in length at top end.

"B. 1."—May have one inch sweep or crook to each 10 feet in length one way only, on not exceeding 15 per cent as above, must be sound, well manufactured, free from unsound knots and injurious shakes, to show one-half heart on all sides, may taper one and one-half inches to 20 feet in length, and may show places of wane 2 inches in width and 2 feet long at one place provided wane at the top end shall be allowed 8 feet in length.

All timber to be square butted and free from splinter draws.

NASHVILLE INSPECTION RULES.

Adopted by the Lumberman's Exchange of Nashville, Tennessee, April 10, 1884. Revised and corrected April 19, 1887. [It should be remembered that all local poplar inspections in the poplar producing districts were intended to be superseded in wholesale shipping by the rules adopted by the Poplar Manufacturers and Wholesale Dealers' Association, at a meeting held at Cincinnati, Ohio, May 15, 1888.]

TO INSPECTORS AND MEASURERS.

It is understood that when the term strips is used, the said strips shall be six inches in width unless otherwise specified. All tapering pieces of lumber to be measured one-third (⅓) the distance from the narrow end, when twelve inches and over in width at the center; and when less than twelve inches wide in center, to be measured at the narrow end. All lumber to be measured in even lengths (except culls), from twelve to thirty feet inclusive in length. Above that length timber shall be counted for what it will measure.

Culls commence ten feet in length, and then measure the same as other qualities. Manufacture should be taken into consideration in all qualities, and if badly manufactured should reduce the grade.

Inspectors and measurers are instructed that the rule herein given as to width and thickness is the standard width and thickness for merchantable lumber of each grade. In no case shall mill culls be considered a quality for the purpose of increasing the inspection fees.

RULES FOR THE INSPECTION OF HARDWOOD LUMBER.

In hardwood inspection the inspector is instructed to use his best judgment, based upon the general rules laid down for his guidance. He must inspect all boards and plank on the poorest side, excepting in flooring. The standard knot is to be considered as not exceeding 1¼ inches in diameter, and of a sound character. Splits are always a greater or less damage to hardwood lumber, and will reduce a piece to one grade lower if the split is over twelve inches in length in boards and plank, or six inches in strips; but splits must be straight and in one end only to be allowed. All hardwood lumber should be sawed 1-16 inch plump. All lumber must be sawed square edged

unless otherwise ordered, and boards and plank having bark or wane must be reduced one grade and measured inside wane or bark. All boards one inch and under thick shall be measured face measure. If sawed one inch scant shall be reduced one grade; if under three fourths of an inch, reduce two grades. All badly mis-sawed lumber shall be classed as culls. No cull is considered as having a marketable value which will not work one-half its size without waste.

Lumber sawed for specific purposes must be inspected with a view to the adaptability of the piece for the intended use, as in many cases it cannot be utilized for other purposes. In the inspection of combined grades of firsts and seconds, an undue predominance of seconds should always be judiciously ascertained, as the purchaser is entitled to the full average in quality, based upon the average mill run of the kind of timber involved.

Standard lengths are always recognized as being 12, 14 and 16 feet, but 10 per cent of 10-feet lengths may be allowed. Shorter than 10 feet does not come within the range of marketable, although sometimes admitted. In black walnut and cherry an exception is made, and 10 feet is recognized as a standard length, and 10 per cent of 8-feet lengths may be admitted in the firsts and seconds and even 6 feet in lower grades. Mill culls are never recognized as marketable; and all culls which will not work to the use for which the timber or the size is applicable, without wasting more than one-half, is a mill cull, and shall be so reported on certificate.

Hickory should never be cut while the sap is rising, as it is then liable to powder-post, and indications of deterioration of this character should be carefully scrutinized by the inspector.

Merchantable includes only sound lumber, free from rot, shake and unsound hearts; hearts in nearly all varieties of lumber are to be excluded from all grades above culls.

It is important that all lumber should be parallel in width, square-edged and with square ends.

In poplar or whitewood marketable thickness shall be recognized as ⅝, ¾, 1, 1¼, 1½, 2, 2½, 3 and 4 inches; ½, 5, and 6 inches are classed as special sizes. When squared, the sizes shall be 4x4, 5x5, 6x6, 7x7, 8x8, 9x9, and 10x10, and shall be sawed ⅛ inch plump.

Worm holes are to be considered as one of the most serious defects in hardwood lumber.

DRESSED LUMBER.

All dressed lumber, such as weatherboards or siding, ceiling, flooring, moulding, etc., shall be measured full width as ripped to work.

POPLAR OR WHITEWOOD.

Inspection grades shall be known as clear, second clear, common and culls.

Clear must be 10 inches or more in width, and free from all defects. The square pieces are exempt from this rule only as to width.

Second Clear must not be less than 8 inches in width and clear up to 10 inches. Boards or plank 10 to 12 inches wide may have one standard knot, but no other defects; or may have bright sap not over 3 inches in width in the aggregate, and no other defects.

Boards and Plank 13 to 16 inches may have two standard knots and no other defects, or may have 4 inches bright sap, not to exceed 2½ inches on any one edge, and no other defects.

Boards and Plank 17 inches and over will allow 5 inches sap, not to exceed 3 inches on any one edge, or two standard knots, or 2 inches sap and one standard knot.

The two grades above enumerated may be combined in one grade to be designated "Firsts and Seconds."

Combined grades of firsts and seconds shall consist of not less than 60 per cent of firsts.

Boards and Plank 1¼ inches thick shall be 8 inches wide and over; ⅝ inch thick shall be 12 inches wide and over.

Common shall include any width not less than 7 inches, and will allow of bright or discolored sap and knots beyond those described in second clear. Two unsound standard knots will be allowed in this grade, if over 12 inches wide, and straight splits shall not be considered a defect; otherwise lumber must be sound.

Culls shall comprise all widths and sizes having more defects than described in common, whether in the lumber or character of the knots, badly checked, and generally such lumber as is unfit for ordinary purposes without waste.

Box Boards is a special grade.

Poplar Strips must be full 6 inches wide, 1 inch plump thick when dry, 12, 14 and 16 feet long. Clear shall be free of all defects. Second clear may have bright sap, and must be free of all other defects. Common shall embrace all sound strips with more defects than second clear. Culls shall contain all unsound strips that will work to one-half their contents, and all tapering strips.

WHITE ASH.

The inspection grades shall consist of firsts and seconds, and culls.

Firsts and Seconds must be 6 in. and over wide, 10 feet and over long and clear up to 8 inches in width. Over 8 inches wide and up to 10 inches will allow one standard knot; 10 inches wide and over will allow two standard knots, but must be free of hearts and dry rot.

Culls include all defective lumber—heart-shaken, knots beyond standard, and defective sawing.

Wagon Tongue must be cut from tough timber, straight and free from all defects.

Flooring must have one face and two edges clear, and 4 to 7 inches wide, inclusive.

WHITE AND BURR OAK.

Shall be inspected as firsts, seconds, common and culls.

Firsts must be 8 inches and over wide and clear up to 10 inches; 10 to 12 inches will allow one defect, and defects may increase with the width.

Seconds at 6 inches wide will allow one standard knot, or a little bright sap. No other defects shall be allowed in this grade, but their extent may increase with the size of the piece.

A combined grade of firsts and seconds must not comprise more than 66⅔ per cent of seconds.

Common must be free from heart-shake, but thick planks may contain sound hearts. All knots must be sound.

Culls consist of bad-heart plank, wormy or generally unsound lumber.

Oak timber must be sound in all respects; sound knot and hearts not showing on the outside of the stick shall not be considered defects.

HICKORY.

Hickory shall be classed as boards, plank and axles. Boards and planks shall be inspected as firsts and seconds in one grade, and must not be less than 6 inches wide if less than 2 inches thick; this grade shall not admit of more than one or two standard knots, but no other imperfections.

Axles must be free from all defects.

Culls include all lumber not up to the preceding description.

Wane is permitted in boards and planks.

BLACK WALNUT

Shall be inspected in three grades—firsts, seconds and culls.

Firsts shall not be less than 8 inches wide and 10 feet long, and may allow one standard knot or 1 inch bright sap on one side, or a check 10 inches long in a board that is 11 inches wide and over, when dry.

Seconds shall be free from heart, wind-shakes and rot. All strips 6 and 7 inches wide, 10 feet and over long, must be clear and straight. Boards 9 inches wide will allow one defect if it is small; boards 10 and 11 inches wide, two defects, provided one is small; boards 12 to 16 inches wide, three defects, if two of them are small; and those 16 inches and over will allow three defects.

All boards must have one black face. Boards 8 inches wide and

over will admit of sap, but not more than one-third on sap side, and the sap shall be counted as a defect. A few worm-holes will be allowed in a second, but as it depends on their location and the width of the board, it will be left to the discretion of the inspector.

Ten per cent of the lumber may be 8 feet long and graded the same as lumber of other lengths.

Culls are all boards that do not come up to the above grades and will work one-half good.

Mill Culls are such lumber as is not included in above grades.

Miscuts.—All miscut boards are to be classified one grade below, and must be measured at the thinnest place.

Common, or Reject, is to be considered a special grade, quality to be decided between seller and buyer.

CHERRY

Shall be classified and graded the same as black walnut.

BUTTERNUT AND CHESTNUT.

Butternut and chestnut shall be inspected in firsts and seconds and culls.

Firsts and Seconds must not be less than 6 inches wide and clear up to 8 inches, but at 8 inches may have an inch of sap, or two standard knots; sap on the face side shall be measured out. Defects may increase with the width in proportion. Worm holes are absolutely excluded from this grade.

Culls include all lumber not up to the standard of seconds, but available not less than one-half to work without waste.

SWEET-GUM.

Sweet-gum shall be inspected in grades of firsts and seconds and common.

First and Seconds must not be less than 6 inches wide, and must be clear up to 10 inches. Over 10 inches may have two standard knots. Sap is wholly excluded from this grade.

Common shall include all lumber not up to the standard of firsts and seconds, in which not less than three-fourths of the piece is available for use without waste.

Culls, worthless.

BASSWOOD, ELM, SYCAMORE, BEECH AND COTTONWOOD.

The above named varieties of lumber shall be classified under an inspection of good and cull, and shall not be less than 6 inches in width.

Good shall include all sound lumber free from shake and hearts. Standard knots from one to five in number do not condemn from this grade in proportion to the width of the piece.

Culls include all lumber not good enough for the preceding grade, but in which one-half the piece will work without waste.

YELLOW PINE

Shall be classed as clear, second clear, standard and common.

Clear must be 10 inches or more in width and free from all defects.

Second Clear must be 8 inches or more wide, and bright sap not called a defect; will allow one or two small sound knots, not over ¾ inch in diameter, showing through if free of other defects; face being clear one narrow wane may be allowed.

Standard is firsts and seconds classed together, 50 per cent being firsts and seconds and 50 per cent common.

Common shall include all lumber poorer than that described as seconds, but free from shake, large, unsound knots, or rot.

Flooring Strips shall be 3 to 6 inches wide, and be classed as first and second clear, 3 and 4 inches wide, may have one sound knot not over ½ inch in diameter, and free of other defects. No strip in this class shall have knot on edge of piece. Bright sap shall not be classed as a defect, but blue stain excluded.

Standard shall contain 50 per cent first and second and 50 per cent common.

Common shall contain all sound strips below firsts and seconds. Knots large enough to weaken a strip will throw it into culls.

Culls all unsound pieces, and all blued sap pieces.

Timber and joists must be square edge, and have no defects that will impair the strength of the piece for the purpose intended.

RED CEDAR.

Inspection grades shall consist of No. 1, common and culls, both in regard to boards and dimension stuff. Sound knots in cedar not considered a defect.

No. 1 must be full 6 inches wide and up, 8 to 16 feet long; will admit half inch of sap on each edge of one face; one face must be red; free from all splits and checks; any thickness from one to two inches; evenly sawed.

Common will admit of boards 4 inches wide and up, 6 to 16 feet long; one sap face; two unsound knots; checks and splits not exceeding 12 inches; clear of wane edges.

Culls will include all boards not good enough for preceding grades, but in which one-third of piece will work without waste.

Dimension Stuff.—No. 1 will include all sizes from 2x4 up, not less than 6 feet in length, and will admit of ½ inch sap on each face in sizes six inches square and over; a half-inch hollow in one end shall not be considered any defect; otherwise must be sound and perfect.

Common will in no wise differ from No. 1 except that sap will be considered no defect, and will admit of small hollow in each end without regard to size; otherwise sound and perfect.

All pieces that do not come up to the above grades will be considered culls.

INSPECTION OF NORTH CAROLINA PINE.

Adopted May 10th, 1888, at Norfolk, Va., by the Carolina Pine Lumber Association, Norfolk, Va.

All Lumber intended for flooring shall be measured at the narrowest and thinnest points, and be 12 ft. long and over.

Prime Lumber.—1 in., 1¼ in., 1½ in. and 2 in., shall be 12 ft. and over long, 6 in. and over wide, clear of knots and all imperfections on both sides and dry.

No. 1 Flooring.—1 in., 1¼ in., 1½ in. and 2 in. thick shall have one side free from knots, shakes or stain and the other side sound. RIFT FLOORING shall admit widths 2½ to 4 in.

No. 1 Stained.—All No. 1 boards slightly stained, shall be classed as No. 1 stained.

No. 2 Flooring.—Shall consist of boards with small tight knots on the best side and to be free from worm holes and shakes. Sap stained boards, clear of knots on one side, below No. 1 stained, are included in this grade.

No. 3.—Shall consist of black stained boards, free from large knots; wormed boards, known as pin-holes, and tight knotty boards—provided there are no large knots in edge of board.

No. 4 or Box.—All boards not coming up to grade No. 3 in quality, are classed as Box or Rough, excepting boards which are unsound or rotten.

Mill Culls.—Consist of all Lumber below No. 4 or Box.

RULES FOR INSPECTION OF WHITE PINE FOR EXPORT.

From the Port of New York, October, 1888.

The rules for inspecting white pine for export are governed entirely by custom. The specifications herewith given have received the approval of one of the oldest and most competent inspectors of export pine in the New York market, who states that the rules given herein, fairly and correctly explain the various grades.

SOUTH AMERICAN SHIPPERS.

South American shippers are 12 inches wide, and 12 to 16 feet long. No. 1 shippers should be sound and red knotted, and what can be designated as a good, clean board. There should be no black knots or branch knots over 4 inches in width on the edge of the piece. The lumber should be absolutely free from shake and splits. In Albany the lumber would be graded as selected dressing. The Michigan shipper would probably have to select out the cream of No. 1 common, and the Chicago grade would be about a good D stock. South American shippers are 1 x 12, 1½ x 12, and 2 x 12.

WEST INDIA SHIPPERS.

A West India shipper is not as good as a South American board. The requirements are 8 inches and over wide, and 12 to 16 feet long. Specifications vary. Occasionally an order will call for a car load averaging 12½ feet to a piece, while another will make it 15 feet, which of course requires a wide average to make it. The quality must be a sound knot, but not necessarily red, and small branch knots are admissible. No shake is admitted, but a split not to exceed 18 inches in one end, will pass. Generally speaking the board must be water tight, as it is used largely for puposes of packing sugar. Objection is raised to discolored lumber—stained or sunburnt—and in taking down a pile the covering boards should not be shipped. The grade corresponds to an ordinary No. 2 barn board.

AUSTRALIA.

Shipments to this market consist of the Albany grades of good fourths, selects and pickings, also No. 1 and No. 2 shelving. A No. 1 shelving corresponds to Albany dressing and better, and No. 2 is a selected South American shipper. Shelving runs from 12 to 22 inches wide, and 12 to 16 feet long, and is dressed four sides. It is imperative that all the grades shall be absolutely dry, free from splits and well manufactured.

MASSACHUSETTS STATE LAWS.

RULES FOR INSPECTION AND MEASUREMENT OF LUMBER.

Chapter 63. Of the Survey and Sale of Lumber, Ornamental Wood and Ship Timber.

SEC. 1. There shall be a Surveyor-general of lumber, appointed by the Governor with the advice and consent of the Council, for a district to consist of the County of Suffolk.

The said Surveyor-general shall reside in said district, shall keep an office in Boston, conveniently located and accessible to the public, shall be sworn and shall give bond with sufficient sureties, to the Treasurer of the Commonwealth in the sum of two thousand dollars for the faithful discharge of his duty, and, unless sooner removed, shall hold his office for three years and until a successor is appointed and qualified.

SEC. 2. He shall appoint a sufficient number of competent and discreet deputy surveyors, removable at his pleasure, and for whom he shall be responsible; they shall be citizens of said district, and shall be sworn and give bond to him for the faithful discharge of their duties. He shall appoint one or more of them to survey oak and other hard wood commonly used in ship-building, and one or more to survey mahogany, cedar and other ornamental wood and lumber.

No Surveyor-general or deputy shall be a dealer in any lumber of the kind he is appointed to survey, nor shall he survey any lumber in which he has a pecuniary interest, directly or indirectly, nor for any person or persons by whom he is employed on a salary or for a *per diem* allowance.

SEC. 3. All applications for surveys shall be made to the Surveyor-general, and all surveys made by his deputies shall be under his direction. He shall, by himself or his deputies, survey and measure all lumber brought into said district for sale, when a request therefor is made by either the purchaser or the seller, and he shall enforce all the provisions of this chapter.

SEC. 4. He shall keep a record of all lumber surveyed by himself or his deputies, and of the amount of fees received by each deputy, and he shall be entitled to ten per cent of such fees. Such record

shall be at all times open to inspection by the members of the city councils and by the selectmen of the several cities and towns in said district.

SEC. 5. He shall annually, on or before the fifteenth day of January, make to the Secretary of the Commonwealth, a return, specifying the amount and the various kinds and qualities of lumber surveyed in said district during the year ending on the thirty-first day of the preceding month, except when special grades are made or freight measurement taken, when the amount and kind of lumber only shall be returned. The person by whom it was surveyed, and the amount of fees received by him and his deputies.

SEC. 6. It shall be the duty of the deputy surveyor to be governed by the provisions of this act under the instructions of the Surveyor-general in determining the quantity and quality of all lumber surveyed by them; to ascertain the true contents of each and every piece of lumber, log or stick, and mark the same in a legible character thereon; to keep a correct piece tally of the same in a plain, legible account, and make return of the said account with bills of survey to the Surveyor-general, to be kept on file by him one year for examination or reference.

SEC. 7. Except in the aforesaid district, towns and the city councils of cities shall annually elect one or more surveyors of lumber, who shall be sworn to the faithful discharge of their duties; and cities may, from time to time, establish ordinances, with suitable penalties respecting the appointment of such surveyors.

SEC. 8. Surveyors of lumber in cities and towns, when requested so to do by either the purchaser or seller, shall survey oak and other hard wood commonly used in ship building, mahogany, ash and other ornamental wood, and all other lumber brought for sale into or manufactured in this Commonwealth. But no such surveyor shall survey lumber in which he has any pecuniary interest.

SEC. 19. Special grades in lumber and special agreements of grades for specific purposes may be made, and freight measurements taken by the deputy surveyors for which they shall be responsible under the instructions of the Surveyor-general, to whom applications must be made in writing for the same.

SEC. 20. The fees for surveying and marking shall be paid by the purchaser (unless otherwise agreed). One-half of the fees paid by the purchaser aforesaid shall be allowed and paid to him by the seller.

SEC. 21. If a Surveyor-general or surveyor of lumber is guilty of or connives at a fraud or deceit in surveying, marking or numbering to contents or quality of any kind of wood or lumber, or if such

surveyor, when requested by the owner of or a dealer in lumber to survey the same, refuses, without good reasons, to perform the duty, he shall forfeit for each offense not less than fifty nor more than two hundred dollars.

SEC. 22. If a seller or purchaser of lumber attempts to induce a surveyor to make a false survey, he shall forfeit for each offense not less than fifty nor more than two hundred dollars.

SEC. 23. Whoever presumes to perform without authority any of the duties of a surveyor of lumber shall forfeit not less than fifty nor more than two hundred dollars.

GRADES OF WHITE PINE.

INSPECTION OF WHITE PINE LUMBER.

White pine boards and plank shall be inspected as first clear, second clear, and third clear. Selects, first fine common, second fine common, first common, second common, wide common, culls, and mill culls.

All boards and plank above the grade of culls shall be well manufactured, parallel in width (if tapering to be measured at the narrow end). All boards one inch and under thick, shall be measured face measure. All lumber in grades above Common shall be thick enough to plane, viz.:

1 inch, to plane two sides,	⅞ inch
1¼ " " " "	1⅛ "
1½ " " " "	1⅜ "
2 " " " "	1⅝ "

All lumber in grades of first and second common should be the same thickness, but if thick enough to plane one side the thickness above specified, will not be reduced in grade. All lumber sawed scant in thickness shall be reduced to next standard thickness, except one inch, which shall be graded as culls. Culls, if tapering, shall be measured in the middle of piece, giving full contents. All Eastern or Western Pine lumber shall be so named in sale, and so specified on inspection statement.

A sap defect shall be equal to one inch in width the entire length of the piece, on one side. In selects and upper grades, white sap is the defect admitted, and in fine common and under grades discolored sap is admitted.

A knot defect shall be equal to a sound knot ¾ inch in diameter.

A split defect shall be equal to a straight split two feet in length and parallel with the edge of the board.

A shake defect shall be equal to one square foot of surface, and not over four feet in length.

First Clear shall be not less than 12 feet long, 12 inches wide, of

soft white pine, and free of defects. At 18 inch and up, wide, two white sap defects may be admitted on one side.

Second Clear shall be not less than 12 feet long, 10 inches wide and free of defects. At 12 inches wide, one white sap or one knot defect, and at 18 inches and up, wide, three white sap or three knot defects may be admitted on one side.

Third Clear shall be not less than 12 feet long, 8 inches wide and free of defects. At 12 inches wide two white sap or two knot defects, and at 18 inches and up, wide, four white sap or four knot defects may be admitted on one side.

Lumber that will grade as uppers at 12 inches wide with one split defect, or at 18 inches wide with two split defects, shall be reduced to selects; with more split defects, to first fine common.

Selects shall be 12 feet long (except that 10 per cent of 10 feet lengths may be allowed), 7 inches and up wide. White sap on outside shall be no defect at any width if face side be perfect. At 12 inches wide, two white sap, one knot or one split defect may be admitted on face side, but white sap shall not cover over two-thirds of sap side. At 18 inches and up wide, four white sap, three knot, or one knot, or two split defects may be admitted on face side, and white sap not to exceed one-third of sap side.

First Fine Common shall be 12 feet long (10 per cent of 10 feet lengths allowed), 7 inches and up wide, white sap defects may be allowed equal to two-thirds of face on sap side, and one-third of face side. At 12 inches wide, white sap one-third of face side, and three knot or two split defects. At 18 inches wide and over, sap one-third of face and five knot or three split defects.

Shakes are not admitted in this and upper grades.

Second Fine Common shall be 10 feet and up long, 7 inches and up wide. White sap shall be no defect in this grade. At 12 inches wide will admit 6 discolored sap, knot or split defects. At 18 inches wide and over, will admit of 9 discolored sap, knot or split defects on face side. One shake defect shall be admitted and is equivalent to 3 other defects.

This grade shall include all lumber whereby a two-thirds proportion of finishing lumber may be obtained by cutting up in three lengths, the shortest not to be less than 2 feet long.

The equivalent of light blue or slightly discolored sap in number 1 and 2 fine common shall be equal to one-half the width allowed of white sap in the same grades.

The standard length that admits knot defects described in second, and third clear, selects, and first and second fine common is 16 feet.

Pine stripe shall be 12 feet and up long, 3, 4, 5 and 6 inches wide

and be graded as first clear, second clear and third clear. The knot defects hereinafter described in strips, shall be those allowed in a board 16 feet long, 6 inches wide. Knot defects shall be in the same proportion in all other widths and lengths.

First Clear may show on face side white sap equal to one-sixth of the width of piece, or two small pencil knots, and on sap side one-sixth of blue sap, and if face side be perfect, will admit one-third blue sap on sap side.

Second Clear may show on face side sap equal to four sound knots one-half inch in diameter, and one-sixth of blue sap on sap side, or if with clear face, one-half of blue sap on sap side.

Third Clear may have equal to six sound knots one-half inch in diameter, or one-third blue sap on face side, and one-half blue sap on sap side; or if face side be better blue sap may cover two-thirds of sap side.

First Common shall be 12 feet long (10 per cent of 10 foot lengths allowed), 7 inches and up wide, and include all boards and plank that are well manufactured, of full thickness, sound character, and that contain small tight knots that will not prevent the whole piece being used for ordinary shelving or good matching work without waste. No shakes allowed in this grade.

Second Common shall be 12 feet long (10 per cent of 10 foot lengths allowed), 6 inches and up wide, and may contain large sound and branch knots and other defects that does not impair the use of the whole piece for coarse ordinary matching purposes. Not over one shake defect allowed in this grade.

Wide Common shall include all boards of the above quality, 12 feet and up long, 13 inches and up wide.

Culls shall include all boards and plank 8 feet and up long, 4 inches and up wide not up to the standard of No. 2 common, when not less than two-thirds of the piece (as a whole) can be used for coarse matching purposes; or the whole piece having good edges with narrow rot streaks and other defects that will not prevent the whole piece being used for coarse boxing purposes.

All boards not up to this standard shall be graded as mill culls.

Norway Pine shall be graded the same as white pine, but shall be specified as Norway on inspection statement.

Waney-edged box boards, pine, bass, poplar and spruce, shall be inspected as good and culls.

Good shall include all sound lumber so free from black, mouldy or rotten sap, rot, wormholes and bad shakes, that not less than two-thirds of entire piece (as a whole) can be used without waste.

Culls shall include all lumber not good enough for the above grade.

SPRUCE AND HEMLOCK.

Spruce boards shall be inspected as first clear, second clear, common and culls. All boards shall be well manufactured, square-edged and square-butted, and thick enough to plane one side seven-eighths of an inch. All boards not up to the required thickness shall be graded as culls.

The knot defects hereinafter described shall be those allowed in a clear board 16 feet long, 6 inches wide. Knot defects in all other widths and lengths shall be in the same proportion.

All boards first and second clear that taper shall be measured at the narrow end.

All coarse boards that taper one inch and over shall be measured one-third the distance from the narrow end.

All coarse boards that taper less than one inch shall be measured in the middle.

White sap is no defect.

First Clear shall be not less than 10 feet long or 4 inches wide in a standard board, defects on the face side may be admitted equal to four sound pencil knots, and on sap side equal to one-half of light blue sap. No wane will be allowed that will not dress off.

Second Clear shall be not less than 10 feet long or 3 inches wide (except that 10 per cent of 8 feet lengths may be allowed). In a standard board, defects on the face side may be admitted equal to six sound knots one-half inch in diameter; or if clear of knots, one inch in width of sap the entire length of board. Light blue sap may cover the whole of the sap side. Wane shall not be admitted on either edge of sap side over one-half inch in width.

Common shall be not less than 10 feet long or 5 inches wide, of sound character and free of defects that will not prevent two-thirds of the piece being used for ordinary work without waste.

Shippers shall include all boards of the above quality 12 feet and up long, 8 inches and up wide.

Culls shall be not less than 6 feet long and 3 inches wide, and include all boards not up to the standard of common. All culls should work one-half their size without waste for coarse work, to be marketable.

Spruce boards and hemlock boards and plank shall be inspected as number one, two, and culls. All lumber shall be well manufactured, square edge and square butted. The boards must be thick enough to plane one side ⅞ inch, and plank to plane one side 1⅞ inch. All scant sawed plank shall be measured as 1½ inch, and all scant sawed boards shall be graded as culls.

All boards or plank that taper less than one inch shall be measured in the middle.

All boards or plank that taper one inch and over shall be measured one-third the distance from the narrow end.

No. 1 shall include all lumber 10 feet and up long, 7 inches and up wide, that can be used without waste for first-class building purposes.

No. 2 shall include all other lumber 10 feet and up long, 6 inches and up wide (except that ten per cent of 8 feet lengths may be allowed), of which not less than two-thirds of entire length of piece can be used without waste.

Culls shall include all lumber not up to standard of No. 2.

Pine, spruce and hemlock dimension, joist, plank and timber, shall be inspected as No. 1, No. 2, and culls.

All lumber shall be well manufactured, square-edged, square butted, parallel width, and full to sizes.

No. 1 and No. 2 joists shall be nine feet and up long, standard sizes, 2 x 3, 2 x 4, and 3 x 4; special sizes, 2 x 2, 3 x 3, and so forth.

No. 1 and No. 2 plank shall be 10 feet and up long, 5 inches and up wide, 1, 1½ and 2 inches thick. All other sizes 3 inches and up thick shall be 12 feet and up long.

All plank that taper less than one inch shall be measured at the narrow end. All plank that taper one inch and over shall be measured in the middle and graded as culls. All badly missawed lumber shall be graded as culls. All plank and timber over ¼ inch less than intended size shall be measured the next standard size it will work.

No. 1 shall include all dimension lumber of sound character, and free of all defects that render it unfit for first-class building purposes without waste.

No. 2 shall include all other dimension lumber in which not less than two-thirds of the entire length can be used for first-class building purposes without waste, or the entire piece be used for ordinary purposes without waste.

Culls shall include all lumber not up to the standard of No. 2.

YELLOW PINE.

SEC. 13. Southern pine shall be classified as flooring, stepping, wide boards, scantling, plank and dimension.

All lumber shall be well manufactured, full to sizes, square butted and graded as No. 1, No. 2, and culls.

All one inch flooring and stepping shall be thick enough to plane one side ⅞ inch, 1¼ inch to plane one side 1⅛ inches, 1½ inch to plane one side 1⅜ inches, and 2 inch to plane one side 1⅞ inches

All 3, 4, 5 and 6 inch flooring shall be reduced to the next width, in inches when less than ⅛ inch narrower than intended width.

All boards or plank not up to the required thickness intended shall be reduced to the next standard thickness, except 1 inch, which, if scant, shall be graded as culls.

Flooring shall be classed as rift, heart, and heart face, and be 12 feet and up long, 3, 4, 5 and 6 inches wide, 1 and 1¼ inches thick.

A sap defect shall be equal to one-sixth of the width the entire length of the piece on one side.

RIFT.

No. 1 shall have one heart face free of all defects, and show rift grain the entire length of piece, but may have one sap defect on sap side.

No. 2 shall include all boards that contain defects, either small pitch streaks, sap or knots on the face side, that will not prevent three-fourths of the entire piece being used as a whole for No. 1 purposes.

HEART.

No. 1 shall have one heart face the entire length of piece, free of defects, but may have one sap defect on sap side.

No. 2 shall include all boards that contain defects, either small pitch streaks, sap, or knots on the face side, that will not prevent two-thirds of the entire piece (as a whole) being used for No. 1 purposes.

HEART FACE.

No. 1 shall have one face free of defects, except sap that will work out in dressing. Sound sap on the sap side is no defect.

No. 2 shall include all boards that contain defects, either pitch streaks, sap or knots on the face side, that will not prevent two-thirds of the entire piece (as a whole) being used for No. 1 purpose.

Culls shall include all boards not up to the standard of No. 2 heart face.

STEPPING

Shall be 12 feet and up long, 8 inches and up wide, and 1, 1¼, 1½ and 2 inches thick.

No. 1 shall show three corners heart, and one face free of defects.

No. 2 shall include all boards that contain defects, either pitch streak, sap or knots on the face side, that will not prevent two-thirds of the entire piece (as a whole) being used for No. 1 purpose.

Culls shall include all boards, not up to the standard of No. 2, that cannot be graded as No. 1 and No. 2 wide boards, and all plank that cannot be graded as No. 1 and No. 2 plank.

WIDE BOARDS

Shall be 12 feet and up long, 7 inches and up wide, and 1 and 1¼ inches thick.

No. 1 shall show one heart face and two-thirds heart on opposite side free from shakes and large or unsound knots.

No. 2 shall include all boards that contain defects that will not prevent two-thirds of the entire piece (as a whole) being used for No. 1 purpose.

Culls shall include all boards not up to the standard of No. 2.

SCANTLING

Shall be 12 feet and up long of the following dimensions: 2 x 3, 4, 5 and 6; 3 x 3, 4, 5 and 6; 4 x 4, 5, 6, 7 and 8; 5 x 5, 6, 7 and 8.

No. 1 shall show three corners heart and not to exceed 1 inch of sap on fourth corner, measured diagonally, free from injurious shakes, large or unsound knots.

No. 2 shall show three corners heart, free from injurious shakes, unsound knots, or knots to impair its strength.

Culls shall include all lumber not up to the standard of No. 2.

PLANK

Shall be 12 feet and up long, 7 inches and up wide, and 1½, 2, 2½, 3, 3½, 4, 4½ and 5 inches thick.

No. 1 shall show one entire heart face. On opposite face not exceeding one-sixth of its width of sap on each corner free from unsound knots, and injurious shakes, sap to be measured on face.

No. 2 shall show one heart face and two-thirds heart on opposite side, free from unsound knots, wane and injurious shakes.

Culls shall include all lumber not up to the standard of No. 2.

DIMENSION

Shall be 12 feet and up long, and include all sizes 6 inches and up in thickness, 9 and up in width, and 6x6, 6x7, 6x8, 7x7, 7x8, 8x8.

No. 1. On all square sizes the sap on each corner shall not exceed one-sixth the width of the face. When the width does not exceed the thickness by 3 inches, to show half heart on narrow faces the entire length; exceeding 3 inches to show heart on narrow faces the entire length; sap on wide faces to be measured as on square sizes.

No. 2. All square lumber shall show two-thirds heart on all sides; other sides shall be two-thirds heart on faces, and show heart entire length on edges, excepting where the width exceeds the thickness by three inches or over, then it shall show heart on edges for two-thirds the length.

Culls shall include all lumber not up to the standard of No. 2.

Special thicknesses and widths in flooring and stepping, and special

sizes in scantling, plank and dimension, and schedule orders, shall be graded under the same inspection and measured full contents.

Southern pine, oak and maple, and other dimension plank and timber ordered for special purposes, such as ship, bridge, car stock, etc., shall be inspected with regard to its intended use as No. 1, No. 2, and culls.

No. 1 shall be free of all defects that will impair its strength or render it unsuitable for first-class work.

No. 2 shall include all other lumber of which not less than two-thirds of entire piece (as a whole) can be used without waste.

Culls shall include all lumber not up to the standard of No. 2.

SHIP TIMBER.

SEC. 14. Hewn timber and round oak and other timber used for masts and ship-building, shall be surveyed and sold as ton timber, at the rate of 40 cubic feet to the ton, and inspected as No. 1, No. 2 and culls.

HEWN TIMBER

Shall be measured to square butts for length. In timber with raft pins or pin holes in both ends, one end only shall be allowed in measurement. If in only one end, and not injurious to the strength of the piece, the total length shall be taken.

The full average size in inches shall be taken for contents midway of stick inside of axe marks not allowing over 1½ inches of taper to every 20 feet in length, and not exceeding 2 inches of wane on any edge.

No. 1 shall be free from all defects that will impair its strength or render it unsuitable for first class work.

No. 2 shall include all other lumber of which not less than two-thirds of entire piece (as a whole) can be used without waste, and must show some heart for two-thirds of its length on all sides and be free from unsound knots, injurious shakes, and rot.

Culls shall include all timber not up to the standard of No. 2.

ROUND TIMBER.

For measurement three-quarters of the diameter shall be taken for the side of the square, to be measured midway of the stick, or if of uneven taper, the average diameter shall be taken and the contents marked thereon.

No. 1 shall be nearly free of defects and suitable for first-class work.

No. 2 shall not contain defects that will prevent two-thirds of entire length being used for first-class work.

Culls shall include all timber not up to the standard of No. 2.

OAK, HACKMATACK AND SPRUCE.

SEC. 15. Oak, hackmatack and spruce knees shall be inspected as No. 1 and Culls. No. 1 shall include all sound knees of the following dimensions:

Arm or Root.	Body.	Working Thickness.
2 feet long.	4 feet long.	4 inches.
2½ "	5 "	5 "
2¾ "	5½ "	6 "
3¼ "	5½ "	7 "
3½ "	5½ "	8 "
3¾ "	6 "	9 "
4 "	6 "	10 " and up.

. Culls shall include all knees that are unsound and not up to the specified dimensions of No. 1.

HARDWOODS.

SEC. 16. Hardwood boards, planks and joists shall be inspected as No 1, No. 2 and Culls.

The inspection shall be from both sides of all boards and planks, excepting flooring and sheathing strips, which shall be inspected from face side and be 3, 4 and 5 inches wide, including 6 and 7 inch whitewood.

All badly missawed lumber shall be graded as culls.

No cull shall be considered to have a marketable value which will not work one-half its size without waste.

All boards one inch thick, and under, shall be measured face measure, and all lumber sawed scant of intended thickness or size shall be reduced to the next standard thickness or size.

All one-inch lumber shall be thick enough to plane 2 sides ⅞ inch; 1¼-inch to plane 2 sides 1⅛ inches; 1½-inch to plane 2 sides 1⅜ inches; 2-inch to plane 2 sides 1⅞ inches.

Lumber sawed for specific purposes, such as newels, balusters, etc., shall be inspected with regard to its fitness for the intended use.

Tapering boards and plank shall be measured at one-third the distance from narrow end.

Standard lengths shall be recognized as 12, 14 and 16 feet. Special lengths, 6 to 11 feet, inclusive. Standard thicknesses, 1, 1¼, 1½, 2, 2½, 3, 4, 5 and 6 inches. Special thicknesses, ⅜, ½, ⅝, ¾, etc.

All boards and plank under 6 feet long shall be graded as culls or measured for quantity only.

Counter tops shall be 12 feet and up long, 18 inches and up wide, 1, 1¼, 1½ and 2 inches thick, and should be nearly clear of all defects.

Squares, 3 x 3, 4 x 4, 5 x 5, 6 x 6, 7 x 7, 8 x 8, 9 x 9, 10 x 10, are not exempt from this inspection on account of width.

Special length and sizes must be specified on inspection statement.

A knot defect shall be equal to the standard knot which shall be sound and not exceed 1¼ inches in diameter.

A split defect shall be equal to a straight split 2 feet in length, and parallel with the edge of the piece.

A white sap defect shall be equal to 1 inch in width the entire length of the piece on one side.

WHITEWOOD OR YELLOW POPLAR.

No. 1 shall be not less than 10 inches in width and free of defects, At 12 inches wide will admit of two white sap defects, and at 16 inches and up, wide, four white sap defects. Face side to be perfect and free of knots.

When 12 inches and up wide, will admit of one split defect.

Black or discolored sap is excluded from No. 1 grade.

No. 2 shall be not less than 8 in. wide, and free of defects. At 10 inches wide will admit of two white sap or one knot defect. At 12 inches wide, of four white sap or two knot defects. At 16 inches wide and up, six white sap or three knot defects on face side.

In No. 2 grade a straight and parallel split shall be no defect.

Discolored sap shall be admitted equal to one-half the width of white sap defects on face, but two-thirds of sap side must show heart face.

Culls shall include all lumber not up to the standard of No. 2.

Plain sycamore and basswood shall be inspected the same as whitewood.

BLACK WALNUT.

No 1 shall be not less than 6 inches wide and free of defects. At 10 inches wide will admit two sap defects on sap side; if wider, will admit of slightly increased defects that will not cause waste for first-class work. Face side to be perfect and free of knots.

No 2 shall be not less than 6 inches wide. At 8 inches, will admit of one knot defect on face side, or two sap defects on opposite side. At 12 inches wide, two knots or one sap defect, and at 16 inches and up wide, three knots or two sap defects on face side. The opposite side must not show more than one-third sap.

Culls shall include all lumber not up to the standard of No. 2.

CHERRY INSPECTION.

The same as Black Walnut. Bad, resinous gum spots or blotches are excluded from No. 1 grade, but a few gum streaks will be admitted.

Gum defects alone in No. 2 grade shall not exceed the limit of knot and sap defects allowed in that grade, and combined defects shall not exceed the same limit.

Butternut and Chestnut the same as Black Walnut. Wormholes are excluded from No. 1 grade.

Sweet Gum the same as Black Walnut. The sap is worthless and excluded from No. 1 grade.

Quartered Sycamore the same as Black Walnut. Sap is excluded from No. 1 grade, face side.

Ash, Oak, Maple, Birch, Beech, Elm and Hickory shall be inspected as No. 1, No. 2, and culls.

No. 1 shall be 6 inches and up wide, and free from all defects.

No. 2 shall be six inches and up wide, and may have a few small sound knots, but two-thirds of the entire piece (as a whole) must be suitable for first-class work without waste.

Culls shall include all lumber not up to the standard of No. 2 grade.

Sap if bright and in good condition, is no defect. Heart shake, rot, dote or wormholes are excluded from No. 1 grade.

Whitewood, Cypress, Black Walnut, Cherry and other hard wood strips for flooring and sheathing, are inspected as No. 1, No. 2, and culls.

STRIPS.

No. 1 must have one perfect face and two sound edges.

No. 2 may have one bright sap defect (except Black Walnut and Cherry), or three small pencil knots.

Culls shall include all lumber not up to the standard of No. 2.

SEC. 17. Mahogany, Spanish Cedar, Satin-Wood, and other foreign hard woods shall be inspected as merchantable and culls.

Merchantable shall include all logs or sticks that are sound and free of defects.

Culls shall include all logs or sticks that are unsound and defective.

Logs may be manufactured somewhat uneven, but should be square butted, as sale measurement will only be taken to square butt.

The rule for measuring merchantable shall be to allow a slab one inch thick on one side of thickness, and a slab two inches thick from one side of the width. The solid contents of the remainder to be taken for sale measurement.

Culls shall be measured full contents, one-half of which shall be deducted for sale measurements.

Each log or stick contained in each lot or cargo shall be numbered and marked in regular numerical order, and on merchantable the sale measurement, and on culls the letter R, and the full measurement shall be marked thereon.

SEC. 18. Whitewood, Maple, Black Walnut and other hard wood logs shall, unless otherwise ordered, be inspected as No. 1, No. 2 and Culls.

In measuring, the diameter shall be taken at the small end (inside the bark) in inches, in sections of 15 feet, and no fractions of an inch shall be allowed.

No. 1 shall include all logs that are sound and free of defects.

No. 2 shall not contain defects that will prevent two-thirds of entire log being used for first-class work.

Culls shall include all logs not up to the standard of No. 2.

YELLOW PINE MERCHANTABLE INSPECTION.

As Adopted by the Southern Lumber & Timber Association, January 30, 1879. Still in Use in Some Sections. Reported to the Publisher from Brunswick, Ga

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Flooring shall show one heart face, regardless of sap on opposite side, be free from through or round shakes or knots exceeding one inch in diameter, or more than four in a board.

Boards shall show one heart face and two-thirds heart on opposite side, free from round or through shakes, large or unsound knots.

Scantling shall show three corners heart, free from injurious shakes, unsound knots, or knots to impair strength.

Plank shall show one heart face and two-thirds heart on opposite side, free from unsound knots, wane through or round shakes.

Dimension Sizes.—All square lumber shall show two-thirds heart on all sides; other sizes shall be two-thirds heart on faces, and show heart entire length on edges, excepting where the width exceeds the thickness by three inches or over; then it shall show heart on edges for two-thirds the length.

All stock to be well and truly manufactured, full to sizes, and saw butted. Lumber to be marked with a knife. No multiples of lengths allowed, unless agreed upon.

NEW YORK INSPECTION.

Rules for the Inspection of Hardwoods adopted by the New York Lumber Trade Association, April 12, 1887.

HARDWOOD INSPECTION.

GENERAL INSTRUCTIONS.

The question of determining the quality of lumber by grading and inspection is so much a matter of judgment, that the inspector must necessarily be guided in a measure by his own discretion, governed by the following rules:

A Standard Knot is not to exceed 1¼ inches in diameter, and must be sound. Larger and loose knots grade the piece of lumber lower, as the judgment of the inspector thinks proper.

Splits are not to exceed 12 inches in length in firsts, or one-fourth the length of the piece in seconds, in the aggregate, and not more than 25 per cent of the whole in either quality may be so split.

Worm Holes not admitted in firsts.

Shakes and heart boards and plank are not admitted in firsts, seconds, or rejects.

Warped, twisted, flooded, stained, and stick rotted lumber is not marketable.

Tapering lumber shall be measured one-third of its length from the narrow end.

Thickness.—All lumber must be sawed square edged and be full thickness when seasoned. All badly sawed, mis-sawed, and uneven lumber to be classed as culls. Lumber sawed for specific purposes, and dimension stock, must conform to the requirements of size and quality for the purpose intended, and be so inspected and measured.

Mill Culls are not marketable except by special arrangement.

Log Run is understood to be the run of the unpicked logs, mill culls out.

Standard lengths are to be 12, 14, and 16 feet, admitting 15 per cent of 10 feet lengths; in walnut and cherry will admit 15 per cent of 8 and 10 feet lengths, 8 feet lengths 12 inches and wider to be clear and graded as firsts, and 9 to 12 inches, clear and graded as seconds.

Newels, from all kinds of timber, are to be cut outside the heart and to be clear, to square 5, 6, 7, 8, 9 and 10 inches when seasoned, and to be in lengths of 4 feet or any multiple thereof.

Balusters.—To be cut exactly square, full size and clear, and to be 75 per cent 33 inches long; 25 per cent may be 28 inches long.

WALNUT.

Grades.—Firsts and Seconds, Rejects and Culls.

Firsts are to be 8 inches and over in width; 8 to 11 inches wide shall be clear. 12 to 15 inches wide will admit bright sap on one side not exceeding one inch in width, or one standard knot, showing only on one side; 16 to 20 inches wide will admit of bright sap on one side not exceeding two inches in width, or two standard knots, showing only on one side.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 12 inches will admit one standard knot; 12 to 15 inches wide will admit of two standard knots; 16 to 20 inches wide will admit of three standard knots.

In any widths, not more than one-fifth of the surface of one side shall be sappy.

Rejects are to be 4 inches and over in width; 4 and 5 inches wide shall be clear, or clear one side; 6 inches and over in width shall include all lumber not equal to the grade of seconds, two-thirds of each piece being merchantable; hearts, board or plank not admitted.

Culls are to include all lumber not equal to the grade of rejects, one-half of each piece being merchantable. All other than as above stated shall be classed as mill culls.

WALNUT JOISTS.

4x4 to 10x10 inches.

Firsts are to be 10 feet and upward in length, clear, sound, and free from all defects, and of full size when seasoned.

Seconds are to be sound and free from hearts, shakes and checks; 10 to 12 feet lengths admit of two standard knots and two inches of sap on two corners; 14 to 16 feet lengths will admit of three standard knots and two inches of sap on two corners.

These defects are based on 6x6 joist, and bear the same ratio in other sizes.

Culls include all joist not equal to the grade of seconds, one-half of the piece being clear.

Other than above stated shall be classed as mill culls.

CHERRY.

Grades.—Firsts, Seconds, Rejects and Culls.

Firsts are to be 8 inches and over in width; 8 to 10 inches wide shall be clear; 11 to 14 inches wide will admit of bright sap on one side not exceeding one inch in width, or one standard knot showing

only on one side; 15 to 20 inches wide will admit of bright sap on one side not exceeding two inches in width, or two standard knots, showing only on one side.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 10 inches wide will admit one standard knot; 11 to 14 inches wide will admit two standard knots; 15 to 20 inches wide will admit three standard knots; in any widths, not more than one-fifth of the surface of one side shall be sappy; gum spots shall be deemed a serious defect, and, if excessive, shall lower the piece one or two grades.

Rejects are to be 5 inches and over in width; 5 inches wide shall be clear, or clear one side; 6 inches and over in width shall include all lumber not equal to the grade of seconds, two-thirds of each piece being merchantable; heart, boards or plank not admitted.

Culls include all lumber not equal to the grade of rejects, one-half of each piece being merchantable; other than as above stated shall be classed as mill culls.

Strips 3 to 7 inches wide shall be clear, or clear faced—the reverse side will admit of one-third sap or one defect.

CHERRY JOISTS.

4x4 to 10x10 inches.

Firsts are to be 10 feet and upward in length, clear, sound, and free from all defects, and of full size when seasoned.

Seconds are to be sound and free from heart, shakes and checks; 10 and 12 feet lengths admit of two standard knots and two inches of sap on two corners; 14 to 16 feet lengths will admit of three standard knots and two inches of sap on two corners. These defects are based on 6x6 joists, and bear the same ratio to other sizes; gum spots not admitted, except where very slight.

Culls include all joist not equal to the grade of seconds, one-half of each piece being merchantable. Other than as above stated shall be classed as mill culls.

OAK—PLAIN.

Grades.—Firsts, Seconds and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide, shall be clear; 13 to 15 inches wide will admit one standard knot, showing only on one side; 16 to 20 inches wide will admit two standard knots, showing only on one side; live sap admitted on one side, not to exceed one-tenth of the surface, if without other defects; worm holes not admitted.

Seconds are to be 8 inches and over in width; 8 to 12 inches wide will admit one standard knot; 13 to 15 inches wide will admit two standard knots; 16 to 20 inches wide will admit three standard knots;

live sap admitted on one side, not to exceed one-fifth of the surface if without other defects; worm holes are serious defects, and should cull any piece, where enough appear to equal one or more standard knots, according to width of the piece.

Culls include all lumber not equal to the grade of seconds, one-half of each piece being merchantable; other than as above stated shall be classed as mill culls.

Oak sawed through and through, not edged, shall be measured inside the wane, and tapering pieces are to be measured in the center.

QUARTERED OAK.

Grades.—Firsts and Seconds.

Firsts are to be 6 inches and over in width; 6 to 9 inches wide shall be clear; 10 inches and over in width will admit one standard knot, showing only on one side, or equal defect.

Seconds are to be 6 inches and over in width; 6 to 9 inches wide will admit one standard knot, or equal defect; 10 inches and over in width will admit two standard knots or equal defects.

Strips 4 to 5 inches wide, shall be clear or clear one side; worm holes in excess of the defects allowed for knots, and stained or discolored boards, not admitted.

ASH.

Grades.—Firsts, Seconds and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit one standard knot, showing only on one side; 16 to 20 inches wide will admit two standard knots, showing only on one side; live white sap allowed.

Seconds are to be 6 inches and over in width; 6 to 7 inches wide shall be clear; 8 to 12 inches wide will admit one standard knot; 13 to 15 inches wide will admit two standard knots; 16 to 20 inches wide will admit three standard knots.

Heart, or doted boards and plank, will not be admitted in firsts and seconds.

Culls include all lumber not equal to the grade of seconds, one half of each piece being merchantable; other than as above stated shall be classed as mill culls.

Strips 4 and 5 inches wide shall be clear or clear one side.

ASH JOISTS.

4x4 to 10x10 inches.

Firsts are to be 10 feet and upward in length, clear, sound and free from all defects, and of full size when seasoned.

Seconds are to be sound and free from heart, shakes and checks; 10 to 12 feet lengths admit two standard knots; 14 to 16 feet lengths

admit three standard knots; bright sap admitted; the defects are based on 6x6 joists, and are to bear the same ratio in other sizes.

Culls include all joist not equal to the grade of seconds, one-half of each piece being merchantable; other than as above stated shall be classed as mill culls.

Second growth ash, sawed through and through, and rough edged, shall be measured inside the wane, and in the center of the piece.

MAPLE.

Grades.—Firsts, Seconds and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit one standard knot, showing only on one side; 16 to 20 inches wide will admit two standard knots, showing only on one side; live white sap allowed.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 12 inches wide will admit one standard knot; 13 to 15 inches wide will admit two standard knots; 16 to 20 inches wide will admit three standard knots; live white sap allowed.

Heart or doted boards and plank will not be admitted in firsts and seconds.

Culls include all lumber not equal to the grade of seconds, one-half of each piece being merchantable; other than as above stated shall be classed as mill culls.

MAPLE JOISTS.

4x4 to 10x10 inches.

Firsts are to be 10 feet and upward in length, clear, sound, and free from all defects, and of full size when seasoned.

Seconds are to be sound and free from hearts, shakes and checks; 10 and 12 feet lengths admit two standard knots; 14 and 16 foot lengths admit three standard knots; bright sap admitted; these defects are based on 6x6 joists, and are to bear the same ratio on other sizes.

Culls include all joist not equal to the grade of seconds, one-half of each piece being merchantable; other than as above stated shall be classed as mill culls.

CHESTNUT.

Grades.—Firsts, Seconds and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit one standard knot showing only on one side; 16 to 20 inches wide will admit of two standard knots, showing only one side.

Seconds are to be 6 inches and over in width; 8 to 12 inches wide will admit one standard knot; 13 to 15 inches wide will admit two standard knots; 16 to 20 inches wide will admit of three standard

knots; worm holes in excess of the defects allowed for knots, and stained or discolored boards, not admitted.

Culls include all lumber not equal to the grade of seconds, one half of each piece being merchantable; other than as above stated shall be classed as mill culls.

CHESTNUT JOISTS.

4x4 and over square, 8, 10, 12, 14 and 16 feet long.

Merchantable must be straight, sound, free from hearts and shakes. 8 and 10 feet admit 2 standard knots, 12, 14 and 16 feet admit 3 standard knots. Must be free from wane except that will admit one inch wane on one corner one-fourth the length. Worm holes in excess of defects allowed for. Knots not admitted. Culls include all joists not equal to the grade of merchantable, one-half of each piece being merchantable. Other than above stated are not marketable.

BIRCH.

Grades.—Firsts, Seconds, and Culls.

Firsts are to be 8 inches and over in width; 8 to 10 inches wide shall be clear; 11 to 14 inches wide will admit bright sap on one side not exceeding one inch in width or one standard knot, showing only on one side; 15 to 20 inches wide will admit bright sap on one side, not exceeding two inches in width, or two standard knots, showing only on one side.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 10 inches wide will admit one standard knot; 11 to 14 inches wide will admit two standard knots; 15 to 20 inches wide will admit three standard knots.

In any widths, not more than one-third of the surface of one side shall be sappy.

BEECH.

Grades.—Firsts, Seconds and Culls.

Firsts are to be 8 inches and over in width; 8 to 10 inches wide shall be clear; 11 to 14 inches wide will admit one standard knot, showing only on one side; 15 to 20 inches wide will admit two standard knots, showing only on one side.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 10 inches wide will admit one standard knot; 11 to 14 inches wide will admit two standard knots; 15 to 20 inches wide will admit three standard knots.

Culls include all lumber not equal to the grade of seconds, half of each piece being merchantable; other than as above stated shall be classed as mill culls.

ELM.

Grades.—Firsts, Seconds, and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit one standard knot, showing only on one side; 16 to 20 inches wide will admit two standard knots, showing only on one side; live white sap allowed.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 12 inches wide will admit one standard knot; 13 to 15 inches wide will admit two standard knots; 16 to 20 inches wide will admit three standard knots.

Live white sap allowed.

Culls include all lumber not equal to the grade of seconds, one-half of each piece being merchantable; other than as above stated shall be classed as mill culls.

POPLAR—WHITEWOOD.

Grades.—Firsts, Seconds, Common, and Culls.

Firsts are to be 10 inches and over in width; 10 to 12 inches wide shall be clear and sound; 13 to 15 inches wide will admit of one inch of bright sap showing only on one side; 16 to 20 inches wide will admit two inches of bright sap showing only on one side, or one standard knot showing only on one side.

Seconds are to be 8 inches and over in width; 8 inches wide shall be clear; 9 to 12 inches wide will admit of two inches of bright sap or one standard knot; 13 to 15 inches wide will admit of three inches of bright sap, or two standard knots; 16 to 20 inches wide will admit of four inches of bright sap, or three standard knots.

Common is to be 5 inches and over in width; 5 and 6 inches shall be clear; 7 inches and over in width include all lumber not equal to the grade of seconds, two-thirds of each piece being merchantable or will admit of one-third the surface discolored sap, or all bright sap boards, when otherwise free from defects.

POPLAR (WHITEWOOD) JOISTS.

4x4 to 10x10 inches.

Firsts are to be 10 feet and upward in length, sound and free from all defects, sawed square, and of full size when seasoned.

Seconds are to be sound and free from hearts, shakes, and checks; 10 and 12 foot lengths admit of two standard knots or two inches of sap on two corners; 14 and 16 foot lengths admit of three standard knots or two inches of sap on two corners; these defects are based on 6x6 joists, and bear the same ratio in other sizes.

Culls include all joists not equal to the grade of seconds, one-half of each piece being merchantable; other than as above stated shall be classed as mill culls.

COTTONWOOD.

Grades.—Firsts, Seconds and Culls.

Firsts to be 8 inches and over in width; 8 to 11 inches wide shall be clear; 12 to 15 inches wide will admit one standard knot showing only on one side; 16 to 20 inches wide will admit two standards knots showing only on one side.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide must be clear; 8 to 12 inches wide will admit one standard knot; 13 to 15 inches will admit two standard knots; 16 to 20 inches wide will admit three standard knots; live bright sap admitted.

Culls include all lumber not equal to the grade of seconds, one-half of each piece being merchantable; other than as above stated shall be classed as mill culls.

BASSWOOD.

Grades.—First, Seconds, and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit one standard knot showing only on one side; 16 to 20 inches wide will admit two standard knots showing only on one side.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 12 inches will admit one standard knot; 13 to 15 inches wide will admit two standard knots; 16 to 20 inches wide will admit three standard knots; live white sap allowed.

Culls include all lumber not equal to the grade of seconds, one-half of each piece being merchantable; other than as above stated shall be classed as mill culls.

SYCAMORE.

Grades.—Firsts, Seconds, and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit bright sap on one side not exceeding one inch in width, or one standard knot, showing only on one side; 16 to 20 inches wide will admit bright sap on one side not exceeding two inches in width, or two standard knots, showing only on one side.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 12 inches wide will admit one standard knot; 13 to 15 inches wide will admit two standard knots; 16 to 20 inches wide will admit three standard knots; in any width not more than one-fifth of the surface of one side shall be sappy.

Culls include all lumber not equal to the grade of seconds, one-half of each piece being merchantable; other than as above stated shall be classed as mill culls.

QUARTERED SYCAMORE.

Grades.—Firsts and Seconds.

Firsts are to be 6 inches and over in width; 6 to 9 inches wide shall be clear; 10 inches and over wide will admit of one standard knot, showing only on one side.

Seconds are to be 6 inches and over in width; 6 to 9 inches wide will admit of one standard knot; 10 inches and over will admit of two standard knots.

Sap and doted, or discolored wood, not admitted in firsts and seconds.

Culls are not marketable.

Strips 4 and 5 inches wide only accepted by special agreement.

GUM.

Grades.—Firsts, Seconds, and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit bright sap on one side not exceeding one inch in width, or one standard knot, showing only on one side; 16 to 20 inches will admit bright sap on one side not exceeding two inches in width, or two standard knots, showing only on one side.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 12 inches wide will admit one standard knot; 13 to 15 inches wide will admit two standard knots; 16 to 20 inches wide will admit three standard knots; in any width not more than one-fifth the surface of one side shall be sappy.

Culls include all lumber not equal to the grade of seconds, one-half of each piece being merchantable; other than as above stated shall be classed as mill culls.

QUARTERED GUM.

Grades.—Firsts and Seconds.

Firsts are to be 6 inches and over in width; 6 to 9 inches wide shall be clear; 10 inches and over wide will admit one standard knot, showing only on one side.

Seconds are to be 6 inches and over in width; 6 to 9 inches wide will admit of one standard knot; 10 inches and over wide will admit of two standard knots.

Sap and doted, or discolored, wood, not admitted in firsts and seconds.

Culls not marketable.

Strips 4 and 5 inches wide shall be clear or clear on one side.

BUTTERNUT.

Grades.—Firsts, Seconds and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide

shall be clear; 13 to 15 inches wide will admit bright sap on one side not exceeding one inch in width, or one standard knot, showing only on one side; 16 to 20 inches wide will admit bright sap on one side not exceeding two inches in width, or two standard knots, showing only on one side.

Seconds are to be 6 inches and over in width; 6 and 7 inches wide shall be clear; 8 to 12 inches wide will admit of one standard knot; 13 to 15 inches wide will admit of two standard knots; 16 to 20 inches wide will admit of three standard knots; in any widths not more than one-fifth of the surface of one side shall be sappy.

Culls include all lumber not equal to the grade of seconds, one-half of each piece being merchantable; other than as above stated shall be classed as mill culls.

HICKORY.

Grades.—Firsts, Seconds and Culls.

Firsts are to be 8 inches and over in width; 8 to 12 inches wide shall be clear; 13 to 15 inches wide will admit one standard knot, showing only on one side; 16 to 20 inches wide will admit two standard knots, showing only on one side.

Seconds are to be 8 inches and over in width; 8 to 12 inches wide will admit one standard knot; 13 to 15 inches wide will admit two standard knots; 16 to 20 inches wide will admit three standard knots.

Culls include all lumber not equal to the grade of seconds, one-half of each piece being merchantable; other than above stated shall be classed as mill culls.

Second Growth Hickory sawed through and through and rough-edged, shall be measured inside the wane, and in the center of the piece.

YELLOW PINE INSPECTION.

New York City Classification and Inspection of Southern Pine Lumber.

Adopted May 14, 1884.

MERCHANTABLE FLOORING.

1 inch and 1¼ inches in thickness, and from 3 to 6 inches in width, and shall show one face free from sap and two-thirds heart the entire length on the opposite face.

Shall be free from rot, splits, shakes and unsound knots, sound knots to be allowed as follows, viz.: Two knots in boards under 16 ft. long; three knots in boards 16 ft. long and over, of not over one inch in diameter, or six knots if not over half an inch in diameter.

MERCHANTABLE FLOORING PLANK.

1½ to 3 inches in thickness, and 5 to 10 inches in width, shall show one face free from sap, except on each edge of the face; one-half

inch of sap shall be allowed and two-thirds heart on opposite face. Free from rot, splits, shakes, unsound knots, and knots exceeding 1¼ inches in diameter.

MERCHANTABLE WIDE BOARDS AND PLANK.

1 inch to 2 inches in thickness, and 10 to 14 inches in width, shall show one face free from sap and two-thirds heart entire length on opposite face. Free from rot, through shakes, splits and unsound knots. Six sound knots of 1 inch and under in diameter, or three of 1½ inches in diameter, to be allowed in any piece.

PRIME WIDE BOARDS AND PLANK.

1 to 2 inches in thickness, and 10 to 14 inches in width, shall show one face and one edge free from sap, and two-thirds heart on the other face the entire length. Free from rot, shakes, splits and knots.

MERCHANTABLE SIDINGS.

1 inch, 1¼ inches and 1½ inches in thickness and 4 inches and over in width. Sap shall be allowed on the face or best side (regardless of sap on the opposite face, as follows: One-half inch on one edge on boards 7 inches and under in width, and one-half inch on each edge of boards over 7 inches wide. Must be free from through shakes, rot, splits and unsound knots, and on the face side the following allowance for knots shall be made, viz.: Three sound knots not exceeding 1 inch in diameter in boards under 14 ft. long; four sound knots not exceeding 1 inch in diameter in boards 14 ft. long and over, or *six* sound knots not exceeding *one-half inch* in diameter in boards of any length.

SCANTLING.

Shall embrace all sizes from 2 to 5 inches in thickness, and from 2 to 6 inches in width.

For example:

2x2, 2x3, 2x4, 2x5, 2x6, 3x3, 3x4, 3x5,
3x6, 4x4, 4x5, 4x6, 5x5, 5x6 and 5x7, 5x8,

and shall show at least three corners heart, and be free from rot, injurious shakes and unsound knots.

MERCHANTABLE PLANK.

Plank shall embrace all sizes, from 2½ to 5 inches in thickness, b 7 inches and up in width.

For example: 2½, 3, 3½, 4, 4½ and 5x7 and up wide.

Plank 10 inches and under in width shall show one heart face and two-thirds heart the entire length on opposite face.

Plank over 10 inches wide shall show one heart face and two-thirds heart the entire length on opposite face, except that on the heart

face 1 inch in width of sap shall be allowed on each edge for not exceeding 4 feet in length, and that in plank over 20 feet long and 14 inches and over wide, wane shall be allowed in two places on the heart face not over ½ inch in width (measured diagonally), on each edge, and not over three feet in length in each place.

All plank shall be free from unsound knots, rot, through and round shakes and wane, except as before stated.

MERCHANTABLE INSPECTION ON DIMENSION SIZES OF SAWN TIMBER.

Shall vary according to the sizes, and the sizes shall be embraced in four divisions, as follows:

FIRST DIVISION.

Shall consist of the following sizes, viz.:

6x6,
6x7, 7x7,
6x8, 7x8, 8x8,
6x9, 7x9, 8x9, 9x9,
6x10, 7x10, 8x10, 9x10, 10x10, 10x12, 11x12,
6x11, 7x11, 8x11, 9x11, 10x11, 11x11, 12x12,

and shall be of the following quality, viz.: free from rot, unsound knots, and through and round shakes, and have two thirds heart the entire length on all sides.

SECOND DIVISION.

Shall consist of all sizes of *square* lumber, 13x13 and over.

For example:

13x13, 14x14, 15x15, 16x16, 17x17, 18x18, etc.,

and shall be of the following quality, viz.: free from rot, unsound knots and through and round shakes, and shall show heart the entire length on all sides.

THIRD DIVISION.

Shall consist of the following sizes, viz.:

6x12, 7x12, 8x12, 9x12,
6x13, 7x13, 8x13, 9x13, 10x13, 11x13, 12x13,
6x14, 7x14, 8x14, 9x14, 10x14, 11x14, 12x14, 13x14,

and shall be of the following quality, viz.: free from rot, unsound knots, and through and round shakes, and shall have two-thirds heart the entire length on the wide faces, and one-half heart the entire length on the edges.

FOURTH DIVISION.

Shall consist of sizes where the width is over 14 inches, and the width exceeds thickness.

For example:

6x15 and up wide,		9x15 and up wide,		12x15 and up wide.		
7x15	"	10x15	"	13x15	"	
8x15	"	11x15	"	14x15	"	etc.,

and shall be of the following quality, viz.: free from rot, unsound knots, and through and round shakes, and have two-thirds heart the entire length on the wide face, and some heart on edges, three-quarters of the length.

All fractional sizes, not herein otherwise provided for, shall be classed and inspected the same as the next lower size.

EXCEPTIONS.

That all *square dimension sizes* over 10x10, 25 ft. long and over, and on faces of all dimension sizes over 10 inches wide and 25 ft. long and over, sap may run across for two faces for not exceeding 2 ft. in length, and one inch of wane (measured diagonally) shall be allowed on two corners for not exceeding 2 ft. in length on each of these corners.

HEWN TIMBER.

Hewn timber shall show some heart for two-thirds of its length on all sides, and not exceeding 2 inches of wane on any edge, shall be free from unsound knots, bad shakes and rot, and shall be well hewn, with not exceeding 1½ inches of taper to every 20 running feet, and shall be measured in the middle of each stick, full contents, with an inch and one-quarter hook, throwing off any fractions of an inch.

In the measurement of Boards, Flooring and Sidings, one and one-half inches and under in thickness, the fractions of a foot in contents less than 9-12 shall be thrown off, and over 9-12 shall be counted as a foot.

In the measurement of Merchantable Sidings, as to widths, they shall be measured whole and half in. only.

For example: 4, 4½, 5, 5½, 6, 6½ in. etc., wide.

MERCHANTABLE ROUGH EDGE OR FLITCH.

Shall be sawed from good hewn timber, and shall be measured in the middle, on the narrow face, and shall be free from injurious shakes and unsound knots.

All stock must be well and truly manufactured, full to sizes and saw butted.

CHESAPEAKE & OHIO LUMBER INSPECTION.

In general use on the line of the Chesapeake & Ohio Railway.

GENERAL REMARKS

In regard to the manufacture of all kinds of lumber, which it is especially desired to impress upon manufacturers, and by which it is important that they should be guided, in order that their lumber may be in the best marketable condition and bring full value, and also as having an important bearing on the *grading* of their lumber, and which inspectors are specially instructed to take into full consideration as part of the rules for their inspection. Both inspectors and manufacturers should note carefully these remarks as to lengths, thickness, width, edges and condition, in reporting lots of lumber on the line of the railway for sale.

Lengths should be 12, 14 and 16 feet; any other lengths should be made only to order. Sixteen feet lengths are preferable, and will generally command higher prices. *All lumber* should be made not less than one inch nor more than two inches *longer* than the measured length. *Ends* must be square. Logs should be sawed off and not chopped.

Thickness and Width.—All lumber manufactured for stock, or to order, must be sawed true, and should be sawed one-eighth inch over the measured thickness and width, except inch boards, which are required to be plump inch *when dry*. There is more inch lumber sold than any other thickness; but thicker lumber generally brings a higher price than inch, and wide lumber a higher price than narrow.

Edges must be square and free from bark and rotten or stained sap.

All Lumber, of whatever kind, should be *handled with care*, and, as soon as sawed, well stuck up, clear of the ground. Stickers or cross pieces, about three inches wide, should be placed between each course, one sticker to cover each end of the course, so as to prevent checking. If the lumber is 16 feet long, four stickers should be used;

if of shorter length, three will answer. They must be placed *directly over each other in every course* to the top. Boards in each course should have not less than two inches space between to allow of free circulation of air and hasten drying, and, when the pile is completed, it should be closely roofed over to keep off sun and rain.

Grades will be called and known as firsts, or No. 1; seconds, or No. 2; culls, or No. 3.

YELLOW POPLAR (WHITEWOOD).

Firsts, or No. 1.—To show not less than 10 inches wide of heart, free from knots, shakes, heart-cracks or other defects. Boards, say 14 inches and up wide, admit of some fresh sap, according to width. Plank three inches and four inches thick will allow of a few pieces eight inches wide in a lot, if perfect.

Seconds, or No. 2.—To show eight inches wide of heart, white sap allowed on one side; if 10 inches and up, two or three small sound knots, according to width, will be allowed; no shakes or heart-cracks. Plank three inches and four inches thick will allow of six-inch widths, or, if perfect, a few four inches to six inches wide, in a lot.

Culls, or No. 3.—Any width or quality that will not pass above inspection, in which is included irregularly sawed lumber, discolored sap, some shakes and checks, or lumber that cannot be used without waste, but does *not* include worthless stuff.

Special specifications will be given for poplar flitches, chair and settee plank, and column, piano, coffin and coach-panel stock, and for extra wide boards or plank, when ordered.

BLACK WALNUT.

Firsts.—Not less than eight inches wide, free from sap, knots, shakes, heart-cracks or splits; wide pieces will admit of *slight* defects that would not be taken in narrow widths.

Seconds.—Not less than six inches wide; a little sap, and a few small, sound knots allowed, according to width. No shakes or heart-cracks. If perfect a few pieces in a lot may be admitted as narrow as four and five inches. No lumber in this grade should cut to waste.

Culls.—Any width, more or less sap, and five to seven knots, according to width; will allow of lumber that cuts to waste in working up; also irregularly sawed lumber; but no *worthless* stuff is included.

In walnut of three and four inches thickness there is no stipulation as to the width; it will be allowed in the grading as above, if 3x4 or 4x4, a few pieces in a lot; but stock smaller than 3x4 or 4x4 should be sawed into baluster or chair stock. In some instances eight feet lengths are taken on above classifications.

Special specifications will be given for walnut flitches, newels, chair, baluster, counter-top and coffin stock, and for extra wide boards or plank, when ordered.

ASH.

In ash, fresh sound sap is allowed the same as if heart in all grades; and, owing to the nature of the timber, due allowance is made for straight splits from seasoning; must be free from heart-centers or dry-rot in first and second grades.

Firsts.—Eight inches and wide, free from knots, shakes, worm-holes, or decay.

Seconds.—Six inches and up wide; at six inches must be free from all defects; at eight inches and over may have one or more knots or other slight defects, in accordance with the width.

Culls.—Any width or quality that will not be received in above grades, including irregularly-sawed lumber, discolored sap, some shakes and checks and dote, or lumber that cannot be used without cutting to waste, but no worthless stuff.

CHERRY AND BUTTERNUT.

Inspection same as for walnut. In cherry. black-gum spots will grade it lower.

BASSWOOD.

Inspection same as for poplar or white wood

MAPLE, BEECH, SYCAMORE, HICKORY AND CHESTNUT.

Special specifications in accordance with the different uses for which these woods are adapted. Sycamore is used mainly for tobacco-boxes, maple for flooring and furniture, beech for carpenters' tools, hickory for wagon-stock, chestnut for house-finishing and furniture, and in chestnut worm-holes are objectionable in the best grade.

WHITE OAK.

Car Lumber.—Must be of good quality of fresh cut timber, free from large or unsound knots, splits, shakes, worm-holes or decay; square edges and ends; sawn true to size, hearts only allowed in the square stuff, and then must be near the center.

Merchantable, or Tie Grade.—Anything in plank or other size timber, free from rot and wind-shakes, but admitting of more knots, light splits, and other slight imperfections than would be allowed in car stuff, and in which the main requirement is, that it be free from any defects that will impair its strength and durability.

The above is the *general* inspection, and in the main will meet the requirements of the grades in oak now in most active demand. Specifications differ with almost every bill for this kind of timber, and much is dependent upon the judgment of the inspector, having

particular regard to the uses for which it is intended; but particular specifications accompanying bills, and on which contracts are based, must be strictly followed.

WHITE PINE.

No suitable classification can be given herein that would meet an inspection which varies in every market of the union.

The following may with safety be given as a general classification for white pine. Although, as stated above, this grading is susceptible of sub-division for such uses as the lumber may be wanted:

Clear.—Any thickness in boards or plank in which the narrow is absolutely free from all defects, such as knots, sap, worm-holes, decay, and wind-shakes, and is sawn true and full; in widths of ten inches and up some sap on one face or edges is allowed, and increases in proportion with the width; very small, sound knots in wide boards being allowed in lieu of sap, but it must not have the two imperfections.

Select.—Boards and plank (also dimension sizes if fully up to specifications) of good manufacture, small, sound, tight, red knots allowed, fresh sap no objection, but must be free from worm-holes, decay, or wind-shakes.

Common.—Boards, plank, and bill timber well manufactured, free from black, loose, or rotten knots, bad shakes, worm-holes, or decay; in short, any imperfections that will impair its strength or durability.

Culls.—All stock that will not classify with above; but there is a grade known as shipping culls which is properly common lumber quality, and lumber that will not grade as common is almost worthless.

LOGS.

The main requirements for shipping logs of any kind of timber are: That they be straight, ends sawed off square, of good color, thin, fresh sap, straight-grained and to all outward appearances sound. Logs that are somewhat defective are sometimes taken, with due allowance therefor. Specifications vary as to diameters and lengths required, as also whether with bark on or off, round or hewn, and whether measured inside sap or mean diameter at small end, and whether, by Scribner's rule, solid contents or cubic.

LUMBER AND TIMBER MEASUREMENTS.

In the United States, and also largely in Canada and Mexico, lumber, timber and logs are sold by the thousand feet, "board measure" In this system called "board measure," the unit is a piece twelve inches square on the surface and one inch thick. This rule is invariable in all thicknesses above one inch, but nothing is reckoned as thinner than one inch. Thus a piece 16 feet long, 12 inches wide and one inch thick measures 16 feet board measure; a piece of the same length and breadth, but two inches thick, measures 32 feet board measure, while a piece of the same length and breadth, but one-half inch thick, measures 12 feet board measure, as would also any other thickness under one inch. A more correct statement would be that all thin (that is, under one inch in thickness) lumber or veneers is measured by the square feet of surface—by the superficial foot. The discrepancy between the nominal measurement and the actual contents of thin lumber is allowed for in the price.

As a general rule, lumber must not be reduced by dressing one side to below its standard thickness. That is, lumber must be sawed slightly thicker than at what it is measured. Matched lumber is given the measurement of the rough lumber from which it is manufactured, though there are some unimportant exceptions to this rule, chiefly in the retail trade.

ENGLISH AND OTHER LUMBER MEASUREMENTS.

In England, and other countries intimately associated in trade with that country, the unit of measurement is the "standard," with the higher denomination, "standard hundred;" consisting, except in the case of the Quebec standard hundred, of 120 pieces of the standard. The following table gives the principal standards in use in England:

NAME.	NO. OF PIECES AND DIMENSIONS.	EQUIVALENT IN BOARD MEASURE.
Petersburg Standard	1 piece, 12 ft. x 11 in. x 1½ in.	16½ feet.
" " Hundred	120 " " " " "	1,980 "
London or Dublin Standard	1 " 12 ft. x 9 in. x 3 in.	27 "
" " " Hundred	120 " " " " "	3,240 "
Christiana Standard	1 " 11 ft. x 9 in. x 1¼ in.	$10\frac{5}{16}$ "
" " Hundred	120 " " " " "	1,237½ "
Drammen Standard	1 " 9 ft. x 6½ in. x 2½ in.	$12\frac{3}{16}$ "
" " Hundred	120 " " " " "	1,462½ "
Quebec Standard	1 " 12 ft. x 11 in. x 2½ in.	27½ "
" " Hundred	100 " " " " "	2,750 "

Quebec.—For details in regard to Quebec inspection, or "culling," and measurement, reference is made to the rules in full on page 53. Deals are generally sold by the Petersburg standard; sometimes by the number of pieces, Quebec standard.

St. John.—Battens, deals and plank are usually sold by the thousand feet, board measure, or by Petersburg standard, and run from 8 to 26 feet long. All pieces under 8 feet are called "ends."

Miramiche and other lower ports are as at St. John, with lengths from 8 to 16 feet.

London.—Pine deals are sold by Petersburg standard; spruce deals by London or Dublin standard; square timber by board or cubic foot, caliper measure.

Liverpool.—Deals are sold by Petersburg standard; square timber by load or cubic foot, string measurement.

Glasgow.—As at Liverpool.

Dublin.—Deals are sold by London or Dublin standard, square timber by ton, string measure.

ENGLISH SQUARE TIMBER MEASURES.

Square timber is bought by the cubic foot or by the "*ton*" of 40 cubic feet, or by the "load" of fifty cubic feet; determined by the string or caliper measure, the latter being a disadvantage to the buyer of from four to nine per cent.

LOG MEASUREMENTS.

The rules in use for the reduction of round logs or timber to cubic feet or to feet board measure are numerous, but those given below are among the principal ones in use. The "string" or "caliper" measure is in use in England or in ports which export to the English market. The Doyle rule is the most generally in use in the United States, having largely superseded the Scribner. The Lumberman's "Favorite" is a rule which, avoiding the inconsistencies of the others, has increased in popularity within a few years past. The Cumberland river rule is used in the section indicated by its name, and the principal market is Nashville, Tenn.

CUSTOM HOUSE CALIPER MEASURE.

This rule is as follows: The mean diameter (in inches) squared, multiplied by the length of the log (in feet), divided by 183. The quotient is the cubic contents.

LIVERPOOL STRING MEASUREMENT.

RULE.—One quarter of the mean circumference of the log (in inches) squared, multiplied by the length of the log (in feet.)

As practiced in New York a fine cord is passed around the center of the log, making allowance for bark; the cord is then doubled twice, giving one fourth the girth. The length of the log is taken to the even foot, rejecting all fractions, and the girth to one-half inch. The contents are computed to the even foot in soft woods, and to the half foot in hardwoods, pitch pine being included in the latter.

By English custom the mean circumference is the mean between the greatest and least girths. Example: A log 30 feet long. Allowing for bark, the girth at the top is 44 inches, at the bottom is 54 inches. The sum of the two is 98 inches, making the mean girth 49 inches. One-fourth of that is 12¼ inches, or 1 foot and ¼ inch. Multiplied by itself and then multiplied by the length, 30 feet, the product is 31¼ cubic feet, the contents of the log.

CUMBERLAND RIVER LOG SCALE.

Showing the number of feet in any straight and perfect Log, from 10 to 18 feet long, and from 15 to 54 inches in diameter.

L *in first column indicates length.*

DIAMETERS.

L	15	16	17	18	19	20	21	22	23	24
10	67	76	86	96	107	118	131	143	156	171
12	80	91	103	115	128	142	157	172	187	205
14	93	106	120	134	149	166	183	201	218	239
16	107	121	137	153	171	180	209	229	243	273
18	120	136	154	172	192	213	335	258	280	307

DIAMETERS.

L	25	26	27	28	29	30	31	32	33	34
10	185	199	216	233	250	267	285	303	323	343
12	222	239	259	279	300	320	343	364	387	411
14	259	279	302	325	350	373	399	425	451	479
16	296	319	345	372	400	427	455	485	516	548
18	333	360	390	420	450	480	513	546	580	517

DIAMETERS.

L	35	36	37	38	39	40	41	42	43	44
10	363	384	404	427	451	474	498	523	548	573
12	435	460	485	512	541	569	598	657	657	687
14	507	536	566	599	631	664	698	731	766	802
16	580	613	647	683	721	759	800	336	876	916
18	652	690	928	768	811	853	900	941	------	------

DIAMETERS.

L	45	46	47	48	49	50	51	52	53	54
10	600	627	654	682	712	742	771	800	829	864
12	720	752	785	819	854	880	925	960	995	1037
14	840	877	916	955	996	1037	1079	1128	1165	1210
16	------	------	------	------	------	------	------	------	------	------
18	------	------	------	------	------	------	------	------	------	------

CLASSIFICATION OF LOGS AND RULES OF MEASUREMENT

Adopted by Lumberman's Exchange, of Nashville, Tenn.

Poplar Logs shall be graded as follows, and designated as No. 1, No. 2, No. 3, and "Cull."

No. 1 shall be 30 inches and upwards in diameter, and fresh cut, green, straight, and free from knots, windshakes and other defects.

No. 2 shall be 27 to 29 inches, inclusive, in diameter, and fresh cut, green, and of the same description as No. 1; or logs 30 inches and up in diameter, that have one to three small solid knots.

No. 3 shall be 24 to 26 inches, inclusive, in diameter, fresh cut, green, and of the same description as No. 1, or logs 27 to 29 inches, inclusive, in diameter, that may have one to three knots.

"Cull" shall embrace any log not filling the above descriptions. All logs shall be cut full length.

The following rules shall govern all measurements for defects in Poplar:

For a hollow log, two thirds of the diameter of the hollow in inches shall be deducted from the diameter of the log, and the hollow shall be measured the long way.

Old Poplar logs—that is, logs that have been held over from one season, or logs with the sap damaged or discolored—shall have four inches deducted from the diameter of the log.

All logs shall be measured at both ends. Where there is a variation of one inch in the diameter, the least end shall be taken as the measurement of the log. If a variation of two inches, the number of inches shall be divided; if three inches the number of inches shall be divided as if only two. If four inches, the diameter shall be divided, but if the difference exceeds four inches, it shall be divided as if only four inches.

When a log is "edged" it shall be measured the flat way.

All crotch or forked logs shall be cut off sufficient to clear the crotch or fork.

All crooked logs shall be classed as "cull" logs unless sufficient deductions are made for straightening.

Spikes. Seller of logs will be held responsible for damages resulting from SPIKES or pieces of iron in logs.

Brands. All logs should be branded before being brought to market. Brands defaced or changed subjects perpetrator to prosecution.

THE LUMBERMAN'S "FAVORITE" LOG RULE.

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DIAMETER IN INCHES.

Feet	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
8	4	8	12	15	19	24	33	42	50	60	72	84	99	114	124	143	162	179	196	218	240	260	8
9	4	9	13	17	21	27	37	47	56	67	80	94	111	128	139	161	182	201	220	245	269	292	9
10	5	10	15	19	24	30	41	52	62	75	90	105	124	142	155	179	203	224	245	272	299	325	10
11	5	11	16	20	26	33	45	57	68	82	98	115	136	156	170	186	223	246	269	299	328	357	11
12	6	12	17	22	28	36	49	62	74	90	107	125	148	170	186	214	243	268	294	326	358	390	12
13	6	13	18	23	30	39	53	67	80	97	115	135	160	184	202	230	263	290	318	353	382	422	13
14	7	14	19	25	32	42	57	72	86	105	124	145	172	198	218	247	283	312	343	380	417	455	14
15	7	15	20	27	34	45	60	77	92	112	133	155	184	212	233	266	303	334	367	407	446	487	15
16	8	16	22	29	37	48	64	82	98	120	142	166	197	226	248	285	324	357	392	434	476	520	16
17	9	17	23	31	39	51	68	87	104	127	151	176	209	240	263	303	344	379	416	461	506	552	17
18	10	18	25	33	42	54	73	93	111	135	160	187	222	255	279	321	364	402	441	489	537	585	18
19	11	19	26	34	44	57	77	97	116	142	168	197	234	268	293	339	384	425	465	515	561	617	19
20	12	20	28	36	46	60	81	102	122	150	177	207	246	282	308	358	405	448	490	542	596	650	20
21	13	21	30	37	47	63	85	107	128	157	185	216	257	296	324	376	425	470	514	569	620	682	21
22	14	22	32	38	48	66	89	112	134	165	192	225	268	310	340	394	446	492	539	597	656	715	22
23	15	23	33	41	52	69	93	118	141	172	203	237	282	325	356	411	466	514	563	627	686	747	23
24	16	24	34	44	56	72	98	124	148	180	214	250	296	340	372	428	486	536	588	652	716	780	24
25	17	25	35	45	58	75	102	129	154	187	222	260	308	354	388	445	506	558	612	679	744	812	25
26	18	26	36	47	60	78	106	134	160	195	231	271	320	368	404	463	526	580	637	706	775	845	26
27	19	27	37	48	62	81	110	139	166	202	239	280	332	382	420	480	546	602	661	733	804	877	27
28	20	28	38	50	64	84	114	144	172	210	248	290	344	396	436	498	566	624	686	760	834	910	28
29	21	29	39	52	66	87	117	149	178	217	257	300	356	410	454	517	592	648	710	787	863	942	29
30	22	30	41	54	68	90	120	154	184	224	266	310	368	424	462	537	609	672	735	814	893	975	30

DIAMETER IN INCHES.

Feet	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	Feet
8	282	300	316	339	367	392	422	441	465	489	518	549	580	606	633	667	701	737	778	810	848	889	8
9	317	337	355	382	410	441	475	496	520	550	583	618	652	682	712	751	789	829	872	912	954	1000	9
10	352	374	395	425	454	491	529	552	575	612	649	687	725	759	792	835	877	922	967	1014	1060	1112	10
11	387	411	434	467	499	540	581	607	632	672	713	755	797	834	869	913	964	1014	1063	1115	1166	1223	11
12	422	448	474	509	544	589	634	662	690	734	778	824	870	910	950	1001	1052	1106	1160	1216	1272	1334	12
13	457	485	513	551	589	638	686	717	747	795	842	892	942	985	1029	1084	1139	1198	1256	1317	1378	1445	13
14	492	522	553	593	634	687	739	772	805	856	907	961	1015	1061	1108	1167	1227	1290	1353	1418	1484	1556	14
15	527	559	592	635	679	736	792	827	862	917	972	1029	1087	1137	1197	1250	1314	1382	1449	1519	1590	1667	15
16	562	596	632	678	725	785	845	882	920	978	1037	1098	1160	1213	1266	1334	1402	1474	1546	1621	1696	1778	16
17	597	634	671	720	770	834	898	937	970	1039	1102	1167	1232	1289	1345	1417	1490	1566	1643	1722	1749		17
18	633	672	711	763	816	883	951	993	1035	1101	1167	1236	1305	1365	1425	1500	1578	1659	1740	1824	1908		18
19	668	708	750	806	862	932	1004	1048	1092	1163	1232	1305	1377	1441	1504	1585	1666	1751	1837	1925	2016		19
20	703	744	790	850	908	982	1058	1104	1150	1224	1298	1374	1450	1518	1584	1670	1754	1844	1934	2026	2124		20
21	738	772	829	892	953	1031	1115	1159	1207	1285	1362	1437	1522	1593	1663	1753	1831	1936	2029	2126	2228		21
22	773	801	869	934	998	1080	1163	1214	1265	1346	1427	1501	1595	1669	1742	1836	1929	2028	2125	2226	2332		22
23	808	848	898	976	1043	1129	1215	1269	1322	1407	1491	1574	1667	1744	1826	1919	2016	2120	2222	2329	2438		23
24	844	896	948	1013	1088	1178	1268	1324	1380	1468	1556	1648	1740	1820	1900	2002	2104	2212	2320	2432	2544		24
25	884	933	987	1060	1133	1227	1320	1379	1437	1529	1620	1716	1812	1895	1979	2085							25
26	914	970	1027	1102	1178	1276	1373	1434	1495	1590	1685	1785	1885	1971	2058	2168							26
27	949	1007	1066	1144	1223	1320	1425	1489	1556	1651	1749	1853	1957	2046	2132								27
28	984	1044	1106	1186	1268	1374	1478	1544	1610	1712	1814	1922	2030	2122	2216								28
29	1019	1081	1144	1230	1315	1423	1532	1600	1667	1778	1880	1991	2102	2199									29
30	1054	1118	1185	1275	1362	1473	1587	1656	1725	1834	1947	2061	2175	2277									30

Synopsis of Doyle's Log Rules.

LENGTH IN FEET.	DIAMETER OF 10	11	12	13	14	15	16	17	18
12	27	37	48	61	75	91	108	126	147
14	32	43	56	71	88	106	126	144	171
16	36	49	64	81	100	121	144	169	196
18	41	55	72	91	112	136	162	190	220
20	46	61	80	101	125	151	180	211	244
22	50	67	88	111	137	166	198	232	269
24	54	74	96	122	150	181	216	254	294
26	59	80	104	132	163	196	234	274	318
28	63	86	112	142	175	212	252	296	342
30	68	92	120	152	188	226	270	316	368

LENGTH IN FEET.	DIAMETER OF 29	30	31	32	33	34	35	36	37	38
12	469	507	547	588	631	675	721	768	817	867
14	547	591	638	686	736	787	841	896	953	1011
16	625	676	729	784	842	900	961	1024	1089	1156
18	703	761	820	882	946	1012	1081	1152	1225	1300
20	782	845	912	980	1052	1125	1202	1280	1361	1446
22	860	930	1004	1078	1156	1238	1322	1408		
24	938	1014	1094	1176	1262	1350	1442	1536		
26	1016	1098	1184	1274	1368	1462	1562	1664		
28	1094	1182	1276	1372	1472	1574	1682	1792		
30	1172	1266	1366	1470	1578	1688	1802	1920		

Synopsis of Doyle's Log Rule.

LOG IN INCHES.

19	20	21	22	23	24	25	26	27	28	
169	192	217	243	271	300	331	363	397	432	12
197	224	253	283	313	350	386	433	463	504	14
225	256	289	324	359	400	441	484	530	576	16
253	288	325	364	406	450	496	544	596	648	18
280	320	361	404	452	500	550	605	661	720	20
309	352	397	445	496	550	605	665	726	792	22
338	384	433	486	541	600	662	726	794	864	24
366	416	470	526	586	650	716	786	860	9 6	26
394	448	506	566	626	700	772	866	926	1008	28
422	480	542	606	672	750	826	906	992	1080	30

LOG IN INCHES.

39	40	41	42	43	44	45	46	47	48	
910	972	1027	1083	1141	1200	1261	1323	1387	1452	12
1070	1134	1198	1264	1331	1400	1471	1544	1618	1694	14
1225	1296	1369	1444	1521	1600	1681	1764	1849	1936	16
1379	1458	1541	1625	1711	1800	1891	1985	2080	2178	18
1530	1620	1712	1805							20
										22
										24
										26
										28
										30

SYNOPSIS OF SCRIBNER'S LOG RULE.

DIAMETER OF LOG IN INCHES.

LENGTH FT.	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	LENGTH FT.
12	59	73	86	107	119	139	160	180	210	228	251	283	303	344	375	411	12
14	69	85	100	125	139	162	187	210	245	266	293	33	353	401	439	479	14
16	79	97	114	142	159	185	213	240	280	304	334	377	404	459	500	548	16
18	88	109	129	160	178	208	240	270	315	342	376	424	454	516	562	616	18
20	98	122	143	178	198	232	267	300	350	380	418	470	505	573	625	684	20
22	108	134	157	196	218	255	293	330	385	418	460	518	555	631	688	753	22
24	118	146	172	214	238	278	320	360	420	456	501	566	606	688	750	821	24

DIAMETER OF LOG IN INCHES.

LENGTH FT.	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	LENGTH FT.
12	436	457	493	532	552	588	600	657	692	772	801	840	905	954	1007	1046	1110	12
14	509	533	575	622	644	686	700	766	807	901	934	980	053	1113	1175	1222	1295	14
16	582	609	657	710	736	784	800	876	923	1029	1068	1120	1204	1272	1343	1396	1480	16
18	654	685	739	799	828	882	900	985	1038	1158	1201	1260	1354	1431	1511	1571	1665	18
20	728	761	821	888	920	980	1000	1095	1152	1287	1335	1400	1505	1590	1679	1745	1850	20
22	800	838	904	976	1012	1078	1100	1204	1268									22
24	873	914	986	1065	1104	1176	1200	1314	1380									24

SHINGLE MANUFACTURE.

The manufacture of shingles is practically the same in all sections of the country, and comprises the two classes of breasted, usually spoken of as shaved, and sawed shingles.

Breasted or shaved shingles are, in white pine, usually eighteen inches in length, the standard thickness being five shingles to two and one-half inches in thickness at the butt, and one-sixteenth inch at the point. Sometimes, though of late but seldom, they are made a full half inch thick at the butt. In some markets, notably as we go South, we find some white pine shingles twenty-four inches long, with butts of five-eighths and points of one-eighth inch. The cypress and cedar shingles of Virginia and further South are largely of twenty, twenty-four and thirty inches length by one-half inch butt.

A breasted shingle should be of full length with square ends, even thickness of butt, and uniform points, with no clips at the point. The dressing or breasting should be perfectly smooth, as though planed, and free from ridges or grooves. Nothing less than a standard shingle four inches wide should be packed in the bunch, although an occasional three inch is not criticised. The edges should be perfectly square, unless, as practiced by some first-class makers, they are uniformly beveled so that one edge will fit the next with a partial overlay.

Breasted shingles are usually packed in bunches of 500, or two bunches to the thousand, the bunches being packed twenty-four inches wide (six shingles) by forty-two courses at each end. Cypress and other extra length shingles are packed in round bunches of 100 shingles each. Clipped and imperfectly breasted shingles are classed as No. 2, or Common. Shaved shingles of less than seven-sixteenths butt must be uniform and nice to be admitted to the brand of No. 1, or Extra.

Sawed shingles are manufactured at different points, of different sizes. Michigan produces for the eastern and southern trade nothing but eighteen inch shingles, while the Chicago and western trade demands only sixteen inch shingles. Some markets use fourteen inch and even twelve inch lengths.

The best sawed shingles are made from split quartered white pine, although the practice of quartering with a saw is an extended one. In the hands of an inexperienced sawyer a sawed block will often be made to turn out bastard shingles, which are objectionable, and, in fact, worthless

upon a roof. Shingles should always be sawed with, and not across the grain. The inspection of shingles of all lengths is the same. Eighteen inch are always sawed five to two and one-fourth inches at the butt, one-sixteenth points, except on special orders for cuts of five to two inches. Sixteen inch shingles are cut five to two inches at the butt, with one-sixteenth inch points.

There are so many designations given to shingles by various manufacturers, that it would be impolitic to give anything but standard classifications. Strictly first-class shingles are always entitled to a brand of XXX, and in bunches so marked should be found only shingles of full length, full thicknesses and uniform points; free from all rot, shake, sap, knots, worm-holes, bastards or defects of any nature; they should be packed in uniform bunches of 250 shingles, four inches wide always being a standard shingle. All shingles the manufacturers of which have adopted fancy brands, such as "Star," "Extra," etc., should come up to the standard given for XXX.

No shingle should be packed in a bunch of No. 2 shingles which is not free from all defects, sap included, to such extent that the shingle is perfect for at least six inches from the butt, and the defects from that to the point must be of a character which will forbid the passage of water through the shingles. These are by some makers branded "six inch clears," while a brand of "ten inch clear," or "twelve inch clear," denotes a shingle free from defects for the length indicated, measuring from the butt.. As a rule no shingles can be considered marketable which will not lay five inches to the weather in eighteen inches, and four inches to the weather in sixteen inches, without showing defects at the butt; eighteen inch XXX are usually laid six inches to the weather, and sixteen inch XXX are laid from four and a half to five inches to the weather.

It is not uncommon, however, to pack the coarse shingles in bunches marked No. 2, where the brands of XXX for the best, and X or XX for the clear butts is adopted. In connection with the brand "A" largely in vogue in the West, "choice A" is the equivalent of XXX, and is better than "standard A," only in some minor respects more fictitious than real, for anything which deserves the name standard is supposed in shingles to mean the best, and custom of many years' standing has decreed that XXX shall always be a standard or choice shingle.

"Shaded A" may represent a clear butt of six, ten or twelve inches, but if the grade is below XXX, be it so called, or be it known as choice or standard, it is a No. 2, and its value can be fixed only by knowing to what extent the manufacturer looked upon defects as admissible in packing.

The main defects in shingles of any length may be summed up as follows: Bad sawing, the butts not running of even thickness, and the points being clipped or feathered. Bastard sawing, by which the grain of

the timber runs across the shingles in circles instead of straight with the length. Bad jointing, so that one end is wider than the other, or by leaving sap, no matter how slight, or any other defects upon a XXX shingle or its equivalent by any name. Bad packing, leaving open spaces between the shingles; putting shingles that are defective in a bunch of XXX; allowing sap streaks, small knots, shake, rot, bad jointing, clips, or shingles sawed thinner or thicker than their mates, in a bunch along side with them; packing shingles narrower than three inches, or a large number of that width in a bunch; mixing in hard, glassy timber, doty timber, worm eaten or discolored shingles. No brand of shingles need hope to obtain a good reputation in any market where the sorting and packing has not been as carefully performed as it would be if the buyer stood by the packing frame and inspected each shingle separately. Manufacturers cannot too strongly impress upon their packers the fact that every shingle in a bunch must be, and is, by the brand, considered as warranted to be perfect in the grade in which it is packed, and nothing will so soon take a half dollar off the price of a lot of shingles, as the finding of three or four defective pieces in a bunch. When a roof is shingled, there should not be found a single discarded shingle among the debris, and when a manufacturer brands his shingles with any of the marks denoting the highest grade, it is understood by the brand that every shingle is perfect.

A word to mill men on sawing. Never allow a wood butcher to handle a shingle saw; he will spoil more shingles and damage your reputation more than you can estimate. Discard your shingle saw and have it reground as soon as it wears to fourteen gauge, unless you prefer to cut your timber into sawdust rather than shingles. The thinner saw you can use the more profit in timber. It pays to get first-class drag saw machinery and sawyers, as well as first-class shingle sawyers—a poor hand is dear, even if he works for nothing and boards himself. A jointer can make a difference of one-third the day's cut by putting the timber in the shaving heap, or by using judgment and trimming only so much as is needed, but always doing that. If you have more than two packers it will pay to keep an assorter to help and to watch them.

Weights of shingles differ according to the character and specific gravity of the timber from which they are cut. In ordinary white pine a car load of 22,000 pounds of green shingles will be about as follows:

18 Inch, Green, 52,000 to 55,000	16 Inch Green, 60 000 to 65,000
18 " Dry... 60,000 " 65,000	16 " Dry... 70,000 " 75,000

The above for an average. The writer has loaded 90,000 eighteen inch shaved shingles, five butts to two and one-fourth inches, shingles one year old, seasoned under cover, on a ten ton rate. One thousand shingles should lay one square, or a space of ten feet by ten feet.

HINTS TO BUILDERS.

STRENGTH OF BUILDINGS—THE "NEBRASKA" SILL.

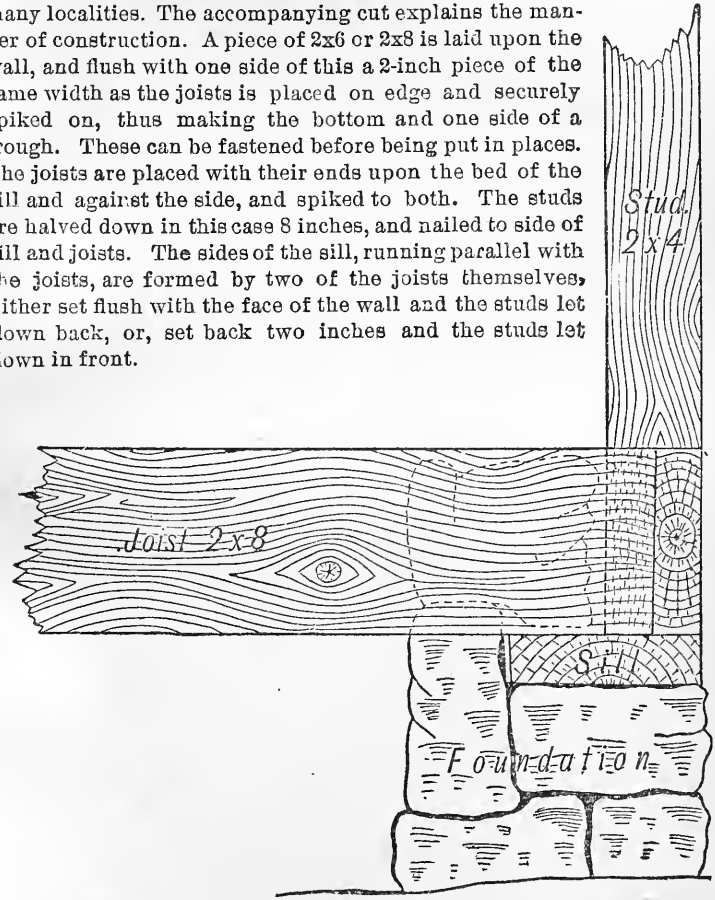
With the increasing prevalence of tornadoes in the west it becomes the duty of carpenters and builders to construct buildings with reference to such unusual strains, and especially should this be done when it involves no additional expense.

The "Nebraska sill" thoroughly ballasts the frame, where a stone foundation is used; but if the building is set on posts they should be securely anchored at a depth of from 4 to 6 feet, and the sills bolted or spiked on. Sheathing put on diagonally acts as a brace over the whole surface, and requires no more lumber than if put on horizontally. It is well to run the sheathing from each side up parallel with the rafters, if at the gable ends, and at a similar angle at the sides. Roofing boards can be put on in the same manner. Studs can be allowed to project above the plates and the rafters spiked to the sides of studs. Partitions should be braced with waste stuff, and in such ways a building can be so strengthened that it can be rolled over and over without coming to pieces, and the extra cost will simply consist in a few hours extra labor.

Many carpenters do not stop to consider how the most strength can be obtained with given materials, but do everything in the manner that first occurs to them, or that will save a little labor. Thus a carpenter ordered 2x8 18s for the floor joists in a 12x18 room. When asked why he did not place them across the room, he replied that every carpenter would order 18s, as it would save framing. A little knowledge of the strength of materials would have told him that a floor laid as he proposed would support less than one-half the weight that the 12 feet joists would sustain, and the amount of material would be the same. In many cases, also, the desire to build as cheaply as possible leads the carpenter to use material of smaller dimensions than are necessary to give the required strength, and so roofs are often inadequate to support more than their own weight, and ceilings sink, cracking and disfiguring the walls.

That all carpenters are so careless and regardless of true principles of construction, is not true, but there are too many, as is shown by the immense number of poorly constructed houses whose floors are sunken and walls twisted. A cheap house need not be a weak one.

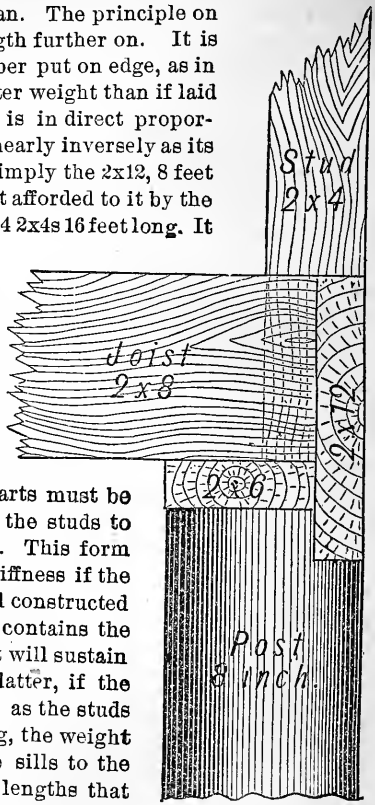
In some parts of the West and especially in Nebraska a framed sill is in use, which combines qualities that will make it of service to builders in many localities. The accompanying cut explains the manner of construction. A piece of 2x6 or 2x8 is laid upon the wall, and flush with one side of this a 2-inch piece of the same width as the joists is placed on edge and securely spiked on, thus making the bottom and one side of a trough. These can be fastened before being put in places. The joists are placed with their ends upon the bed of the sill and against the side, and spiked to both. The studs are halved down in this case 8 inches, and nailed to side of sill and joists. The sides of the sill, running parallel with the joists, are formed by two of the joists themselves, either set flush with the face of the wall and the studs let down back, or, set back two inches and the studs let down in front.



When the frame is finished, and before the floor is laid, the wall is built up behind and over the sill; thus holding all in place, guarding against wind, as the wall must be torn up before the building will go; and also, incidentally, against rats and other vermin. It will be found fully as strong and much cheaper than timber.

If posts are used for the foundation a modification of this arrangement will prove equally serviceable. The following diagram illustrates the

difference more plainly than words can. The principle on which it depends is explained at length further on. It is well known that a thin piece of timber put on edge, as in joists, etc., will support a much greater weight than if laid on its side. The strength of a piece is in direct proportion to the square of its depth and nearly inversely as its length. Thus it will be found that simply the 2x12, 8 feet long, without considering the support afforded to it by the walls, would have a strength equal to 4 2x4s 16 feet long. It might be objected that the joists would not rest on the 2x12 but on the 2x6. This is partly true, but the joists are spiked to the 2x12, and are nailed to the studs, which rest on the sill, thus binding the whole together. Particular care must be taken to spike the 2x12 side of the sill to the 2x4 or 2x6 base at short intervals. All the parts must be well nailed together, and especially the studs to the joists, and the sills to the posts. This form will have abundant strength and stiffness if the posts are not over 8 feet apart. A sill constructed in this way, of these dimensions, contains the same number of feet as a 6x6 sill, but will sustain a weight a third greater than the latter, if the weights are placed at the centers, but as the studs are fastened together by the sheathing, the weight will be partly transferred from the sills to the posts. It can also be made of any lengths that will reach from post to post, and the cost can thus be made less.



STRENGTH OF MATERIALS.

Materials are subjected in machinery and buildings to one or more of four different strains affecting their durability, viz.:

1st.—Tension, or a force which tends to pull apart the fibres or particles of a substance; such a force is exerted in tie beams, suspension rods, ropes, etc.

2d.—Compression, or a force tending to crush the substance, as in columns, braces, arches, etc.

3d.—Transverse or lateral strains, tending to break apart the fibers, as in joists, girders, etc.

4th.—Torsion, or twisting, as in shafts, screws, etc.

TENSION.

That property of materials which enables them to resist tension is called their cohesive force. The following table gives the force necessary to pull apart a rod of one square inch section of the various materials given. These results have been obtained from numerous experiments.

METALS.

	POUNDS.		POUNDS.
Brass	35,600	Lead, cast	880
Copper, cast	22,500	Lead, milled	3,320
Copper, wire	30,900	Platinum wire	53,000
Iron, cast	20,000	Silver, cast	41,000
Iron, cast, English	52,000	Silver, wire	38,250
Iron, wrought	60,000	Steel, soft	120,000
Iron, wrought, Swedish	72,000	Steel, fine	135,000
Iron, wrought, English	56,000	Steel, razor, tempered	150,000
Iron, wire	85,700	Tin, cast block	50,000
Iron, wire	113,000	Zinc, cast	2,600
Iron, medium bar	60,000	Zinc, sheet	16,000
Iron, inferior bar	30,000		

WOODS.

	POUNDS.		POUNDS.
Ash, white, seasoned	14,000	Mahogany	21,800
Ash, red, seasoned	17,800	Mahogany, Spanish	12,000
Birch	15,000	Maple	10,500
Beech	11,000	Oak, white	15,000
Cedar	11,000	Oak, English	10,000
Chestnut, sweet	10,000	Oak, seasoned	13,500
Cypress	6,000	Pine, white	10,000
Elm	13,000	Pine, pitch	12,000
Elm, rock	16,000	Pine, Norway	13,000
Fir, American	8,500	Poplar	7,000
Lance wood	24,000	Sycamore	13,000
Lignum Vitæ	12,000	Walnut	17,000
Locust	20,000	Willow	13,000

MISCELLANEOUS.

	POUNDS.		POUNDS.
Brick	290	Marble	9,000
Glass, plate	9,400	Morter, 20 years old	52
Hemp, fibres glued together	92,000	Slate	12,000
Hemp, rope	19,600	Stone, fine grain	200
Ivory	16,000	Whalebone	7,600

In practice one fourth of the above weights is taken as the strength of the material.

COMPRESSION.

The following table gives the number of pounds resistance a square inch

of the given materials will oppose to compression without permanent alteration.

	POUNDS.		POUNDS.
Ash	3,540	Lead, cast	1,500
Beech	2,360	Mahogany	3,800
Brass	6,700	Oak, English	3,950
Brick	560	Pine, American yellow	3,900
Cast iron	15,300	Steel	45,000
Elm	3,240	Stone, Portland	3,700
Granite, Aberdeen	10,900	Tin, cast	2,880
Gun metal, cast	10,000	Whalebone	5,600
Iron, malleable	17,800	Zinc, cast	5,700

As in tension, material should never be loaded with more than one-fourth of its utmost strength.

TRANSVERSE STRAINS.

Many experiments have been made to determine the breaking strain of different building materials. The average results are given in the following table, the pieces used in the experiment being uniform rods one foot long, and with ends one inch square, supported horizontally by standards at each end, and the weight applied perpendicularly at the center.

	POUNDS.		POUNDS.
Ash	635	Iron, cast (extreme weight without making permanent change)	850
Beech	677	Oak	660
Birch	517	Poplar, Lombard	327
Chestnut	450	Spruce, American	570
Elm	540	Walnut, green	487
Hard pine, American	658		

As this table expresses the breaking weight of each piece it would not be safe to permanently load them with more than one-fourth the weight given in the table.

Experiments have shown, and mathematical calculations demonstrated, that the strength of beams and girders varies, inversely as their length, and directly as their width and the squares of their depths. Thus, a beam 8 feet long will be only one-half as strong as one of the same breadth and depth, and 4 feet long; and the latter will be four times as strong as one of the same breadth and depth, and 16 feet long. Two beams of the same length and depth will sustain a weight just in proportion to their width; by doubling the width the strength is doubled. If two pieces have the same length and breadth their strength will be as the square of their depths. If one has twice the depth of the other, it will sustain a weight four times as great. A 2x12 8 will bear four times the weight that a 2x6 8 will, the 2x6 8 will bear one-third the weight that a 6x6 8 will sustain. Therefore, a 2x12 placed on edge will bear a weight placed on its center

one-third greater than can be borne by a 6x6 of the same length. The above is not strictly true in regard to lengths, as the strength appears to diminish in a ratio greater than the inverse proportion of the length; caused, probably, by the tendency to bulge and twist in long pieces of timber. This error is provided for in the following *rule:*—To find from the foregoing table the breaking weight of any piece of timber, the length, breadth and thickness being given: Divide the breaking weight given in the table by the length in feet; subtract 10 from the quotient; multiply the remainder by the breadth in inches and that product by the square of the depth in inches.

EXAMPLE:—Required the breaking weight of a hard pine scantling 2 in. $\times$12 in. $\times$10 feet supported at ends.—658$\div$10=65, 65—10=55, 55$\times$2$\times$144= 15.840=breaking weight, 15.840$\times$4=3,960= greatest weight it should be required to support permanently.

EXAMPLE:—Required the breaking weight of a hard pine sill 6 in. $\times$6 in. $\times$10 feet, supported at the ends; 658$\div$10=65, 65—10=55, 55$\times$6$\times$36=10,880 =breaking weight, 10,880$\div$4=2,720=greatest weight the sill should be required to bear.

The following dimensions, taken from the Liverpool Building Act, may be considered as standard sizes of joists for ordinary buildings. The distances between centers being one foot, joists in floors, clear bearing.

Exceeding	7	and not exceeding	10	ft.	should be	not less	than 6x2 in.
"	10	"	12	"	"	"	6x2½ "
"	12	"	14½	"	"	"	7x2½ "
"	14½	"	16	"	"	"	8x2½ "
"	16	"	18	"	"	"	9x2¾ "
"	13	"	20	"	"	"	10x2¾ "
"	20	"	22	"	"	"	11x3 "
"	22	"	24	"	"	"	12x3 "

As timber does not come in fractions of inches, when a greater width or depth is used than that indicated the distance between centers can be increased proportionally.

TORSION.

This form is very seldom to be considered in calculating the strains to which building material is subjected, and its discussion will, therefore, be omitted from this book. Its province is in machinery, and its effect on shafts, etc., must be considered, and made the subject of special study, by the mechanical engineer.

RETAILER'S READY RECKONER.

The tables on the following pages will be found useful to retail lumbermen. They are prepared for the purpose of enabling the ready ascertaining of the number of feet and fractions of a foot contained in a given number of pieces of any size of timber ordinarily kept in stock, from twelve to thirty feet in length, and from 1x12 to 12x12 in size. The top line in each table shows the exact fractions over a full foot in each size. In all others, fractions under one-half are excluded, and over one-half added. To ascertain the number of feet in a given number of pieces of any size named in the tables, find the length in the top line and the number of pieces at the left hand and trace the two lines to their junction, where the number of feet will be found. To ascertain the feet in any number of pieces not specified, add together the two or more quantities making that number. For example: To find the number of feet and fractions of a foot in twenty-five pieces of 2x4 sixteens, run down the sixteen foot column to its junction with the twenty at the left, the number found there being 213; then trace the line from five at the left hand to its junction with the sixteen foot column, obtaining as the result, 53, which added to the 213 gives 266 feet, the correct amount in twenty-five pieces of 2x4 sixteens. If greater lengths are required, double the figures in the columns which are multiples of those required. Thus: for thirty-two, double sixteen; for thirty-four, add the sixteen and eighteen together. This process will give all the lengths up to sixty feet.

1 × 8 or 2 × 4.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	8	9 1/3	10 2/3	12	13 1/3	14 2/3	16	17 1/3	18 2/3	20
2	16	19	21	24	27	29	32	35	37	40
3	24	28	32	36	40	44	48	52	57	60
4	32	37	43	48	53	59	64	69	75	80
5	40	47	53	60	67	73	80	87	93	100
6	48	56	64	72	80	88	96	104	112	120
7	56	65	75	84	93	103	112	121	126	140
8	64	75	85	96	107	117	128	139	149	160
9	72	84	96	108	120	132	144	156	168	180
10	80	93	107	120	133	147	160	173	187	200
20	160	187	213	240	267	293	320	347	373	400
50	400	467	533	600	667	733	800	867	917	1000
100	800	933	1067	1200	1333	1467	1600	1733	1867	2000

1×12, 2×6 or 3×4.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	12	14	16	18	20	22	24	26	28	30
2	24	28	32	36	40	44	48	52	56	60
3	36	42	48	54	60	66	72	78	84	90
4	48	56	64	72	80	88	96	104	112	120
5	60	70	80	90	100	110	120	130	140	150
6	72	84	96	108	120	132	144	156	168	180
7	84	98	112	126	140	154	168	182	196	210
8	96	112	128	144	160	176	192	208	224	240
9	108	126	144	162	180	198	216	234	252	270
10	120	140	160	180	200	220	240	260	280	300
20	240	280	320	360	400	440	480	520	560	600
50	600	700	800	900	1000	1100	1200	1300	1400	1500
100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000

9×16 or 12×12.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	144	168	192	216	240	264	288	312	336	360
2	288	336	384	432	480	528	576	624	672	720
3	432	504	576	648	720	792	864	936	1008	1080
4	576	672	768	864	960	1056	1152	1248	1344	1440
5	720	840	960	1080	1280	1320	1440	1560	1680	1800
6	864	1008	1152	1296	1440	1584	1728	1872	2016	2160
7	1008	1176	1344	1512	1680	1848	2016	2184	2352	2520
8	1152	1344	1536	1728	1920	2112	2304	2496	2688	2880
9	1296	1512	1728	1944	2160	2376	2592	2808	3024	3240
10	1440	1680	1920	2160	2400	2640	2880	3120	3360	3600
20	2880	3360	3840	4320	4800	5280	5760	6240	6720	7200
50	7200	8400	9600	10800	12000	13200	14400	15600	16800	18000
100	14400	16800	19200	21600	24000	26400	28800	31200	33600	36000

4×7 and 2×14.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	28	32⅔	37⅓	42	46⅔	51⅓	56	60⅔	65⅓	70
2	56	65	75	84	93	103	112	121	131	140
3	84	98	112	126	140	154	168	182	196	210
4	112	131	149	168	187	205	224	243	261	280
5	140	163	187	210	233	257	280	303	327	350
6	168	196	224	252	280	308	336	364	392	420
7	196	229	261	294	327	359	392	425	457	490
8	224	261	299	336	373	411	448	485	523	560
9	252	294	336	378	420	462	504	546	588	630
10	280	327	373	420	467	513	560	607	653	700
20	560	654	747	840	934	1027	1120	1213	1307	1400
50	1400	1632	1867	2100	2333	2567	2800	3033	3267	3500
100	2800	3267	3733	4200	4667	5133	5600	6067	6533	7000

2×12, 3×8 or 4×6.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	24	28	32	36	40	44	48	52	56	60
2	48	56	64	72	80	88	96	104	112	120
3	72	84	96	108	120	132	144	156	168	180
4	96	112	128	144	160	176	192	208	224	240
5	120	140	160	180	200	220	240	260	280	300
6	144	168	192	216	240	264	288	312	336	360
7	168	196	224	252	280	308	336	364	392	420
8	192	224	256	288	320	352	384	416	448	480
9	216	252	288	324	360	396	432	468	504	540
10	240	280	320	360	400	440	480	520	560	600
20	480	560	640	720	800	880	960	1040	1120	1200
50	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000
100	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000

1×18, 2×9 or 3×6.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	18	21	24	27	30	33	36	39	42	45
2	36	42	48	54	60	66	72	78	84	90
3	54	63	72	81	90	99	108	117	126	135
4	72	84	96	108	120	132	144	156	168	180
5	90	105	120	135	150	165	180	195	210	225
6	108	126	144	162	180	198	216	234	252	270
7	126	147	168	189	210	231	252	273	294	315
8	144	168	192	216	240	264	288	312	336	360
9	162	189	216	243	270	297	324	351	378	405
10	180	210	240	270	300	330	360	390	420	450
20	360	420	480	540	600	660	720	780	840	900
50	900	1050	1200	1350	1500	1650	1800	1950	2100	2250
100	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500

1×16, 2×8 or 4×4.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	16	18⅔	21⅓	24	26⅔	29⅓	32	34⅔	37⅓	40
2	32	37	43	48	53	59	64	69	75	80
3	48	56	64	72	80	88	96	104	112	120
4	64	75	85	96	107	117	128	139	149	160
5	80	93	107	120	133	147	160	173	187	200
6	96	112	128	144	160	176	192	208	224	240
7	112	131	149	168	187	205	224	243	261	280
8	128	149	171	192	213	235	256	277	299	320
9	144	168	192	216	240	264	288	312	336	360
10	160	187	213	240	267	293	320	347	373	400
20	320	373	427	480	533	587	640	693	747	800
50	800	933	1067	1200	1333	1467	1600	1733	1867	2000
100	1600	1867	2133	2400	2667	2933	3200	3467	3733	4000

2½×8, 2×10 or 4×5.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	20	23½	26⅔	30	33⅓	36⅔	40	43⅓	46⅔	50
2	40	47	53	60	67	73	80	87	93	100
3	60	70	80	90	100	110	120	130	140	150
4	80	93	107	120	133	147	160	173	187	200
5	100	117	133	150	167	183	200	217	233	250
6	120	140	160	180	200	220	240	260	280	300
7	140	163	187	210	233	257	280	303	327	350
8	160	187	213	240	267	293	320	347	373	400
9	180	210	240	270	300	330	360	390	420	450
10	200	233	267	300	333	367	400	433	467	500
20	400	467	533	600	667	733	800	867	933	1000
50	1000	1167	1333	1500	1667	1833	2000	2167	2333	2500
100	2000	2333	2667	3000	3333	3667	4000	4333	4667	5000

2×15, 2½×12, 3×10 or 5×6.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	30	35	40	45	50	55	60	65	70	75
2	60	70	80	90	100	110	120	130	140	150
3	90	105	120	135	150	165	180	195	210	225
4	120	140	160	180	200	220	240	260	280	300
5	150	175	200	225	250	275	300	325	350	375
6	180	210	240	270	300	330	360	390	420	450
7	210	245	280	315	350	385	420	455	490	525
8	240	280	320	360	400	440	480	520	560	600
9	270	315	360	405	450	495	540	585	630	675
10	300	350	400	450	500	550	600	650	700	750
20	600	700	800	900	1000	1100	1200	1300	1400	1500
50	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
100	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500

2×16 and 4×8.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	32	37 1/3	42 2/3	48	53 1/3	58 2/3	64	69 1/3	74 2/3	80
2	64	75	85	96	107	117	128	139	149	160
3	96	112	128	144	160	176	192	208	224	240
4	128	149	171	192	213	235	256	277	299	320
5	160	187	213	240	267	293	320	347	373	400
6	192	224	256	288	320	352	384	416	448	480
7	224	261	299	336	373	411	448	485	523	560
8	256	299	341	384	427	469	512	555	597	640
9	288	336	384	432	480	528	576	624	672	720
10	320	373	427	480	533	587	640	693	747	800
20	640	747	853	960	1066	1173	1280	1387	1493	1600
50	1600	1867	2034	2400	2665	2933	3200	3467	3734	4000
100	3200	3734	4266	4800	5330	5867	6400	6933	7469	8000

2×18, 3×12 or 6×6.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	36	42	48	54	60	66	72	78	84	90
2	72	84	96	108	120	132	144	156	168	180
3	108	126	144	162	180	198	216	234	252	270
4	144	168	192	216	240	264	288	312	336	360
5	180	210	240	270	300	330	360	390	420	450
6	216	252	288	324	360	396	432	468	504	540
7	252	294	336	378	420	462	504	546	588	630
8	288	336	384	432	480	528	576	624	672	720
9	324	378	432	486	540	594	648	702	756	810
10	360	420	480	540	600	660	720	780	840	900
20	720	840	960	1080	1200	1320	1440	1560	1680	1800
50	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500
100	3600	4200	4800	5400	6000	6600	7200	7800	8400	9000

4×12 or 6×8.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	48	56	64	72	80	88	96	104	112	120
2	96	112	128	144	160	176	192	208	224	240
3	144	168	192	216	240	264	288	312	336	360
4	192	224	256	288	320	352	384	416	448	480
5	240	280	320	360	400	440	480	520	560	600
6	288	336	384	432	480	528	576	624	672	720
7	336	392	448	504	560	616	672	728	784	840
8	384	448	512	576	640	704	768	832	896	960
9	432	504	576	648	720	792	864	936	1008	1080
10	480	560	640	720	800	880	960	1040	1120	1200
20	960	1120	1280	1440	1600	1760	1920	2080	2240	2400
50	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000
100	4800	5600	6400	7200	8000	8800	9600	10400	11200	12000

10×10 or 8×12½.

Fractions over ½ added, others excluded.

Nos. Pieces	12	14	16	18	20	22	24	26	28	30
1	100	116⅔	133⅓	150	166⅔	183⅓	200	216⅔	233⅓	250
2	200	233	267	300	333	367	400	433	467	500
3	300	350	400	450	500	550	600	650	700	750
4	400	467	533	600	667	733	800	867	933	1000
5	500	583	667	750	833	917	1000	1083	1167	1250
6	600	700	800	900	1000	1100	1200	1300	1400	1500
7	700	817	933	1050	1167	1283	1400	1517	1633	1750
8	800	933	1067	1200	1333	1467	1600	1733	1867	2000
9	900	1050	1200	1350	1500	1650	1800	1950	2100	2250
10	1000	1167	1333	1500	1667	1833	2000	2167	2333	2500
20	2000	2333	2667	3000	3333	3667	4000	4333	4667	5000
50	5000	5833	6667	7500	8333	9167	10000	10833	11667	12500
100	10000	11667	13333	15000	16667	18333	20000	21667	23333	25000

10×12 or 8×15.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	120	140	160	180	200	220	240	260	280	300
2	240	280	320	360	400	440	480	520	560	600
3	360	420	480	540	600	660	720	780	840	900
4	480	560	640	720	800	880	960	1040	1120	1200
5	600	700	800	900	1000	1100	1200	1300	1400	1500
6	720	840	960	1080	1200	1320	1440	1560	1680	1800
7	840	980	1120	1260	1400	1540	1680	1820	1960	2100
8	960	1120	1280	1440	1600	1760	1920	2080	2240	2400
9	1080	1260	1440	1620	1800	1980	2160	2340	2520	2700
10	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000
20	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000
50	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000
100	12000	14000	16000	18000	20000	22000	24000	26000	28000	30000

4×16 and 8×8.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	64	74⅔	85⅓	96	107	117⅓	128	138⅔	149⅓	160
2	128	149	171	192	213	235	256	277	299	320
3	192	224	256	288	320	352	384	416	448	480
4	256	299	341	384	427	469	512	555	597	640
5	320	373	427	480	533	587	640	693	747	800
6	384	448	512	576	640	704	768	832	896	960
7	448	523	597	672	747	821	896	971	1045	1120
8	512	597	683	768	853	939	1024	1109	1195	1280
9	576	672	768	864	960	1056	1152	1248	1344	1440
10	640	747	853	960	1067	1173	1280	1387	1493	1600
20	1280	1493	1707	1920	2133	2347	2560	2773	2987	3200
50	3200	3733	4267	4800	5333	5867	6400	6933	7467	8000
100	6400	7467	8535	9600	10667	11733	12800	13868	14933	16000

8×10 or 5×16.

Fractions over ½ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	80	93⅓	106⅔	120	133⅓	146⅔	160	173⅓	186⅔	200
2	160	187	213	240	267	293	320	347	373	400
3	240	280	320	360	400	440	480	520	560	600
4	320	373	427	480	533	587	640	693	747	800
5	400	467	533	600	667	733	800	867	933	1000
6	480	560	640	720	800	880	960	1040	1120	1200
7	560	653	747	840	933	1027	1120	1213	1307	1400
8	640	747	853	960	1067	1173	1280	1387	1493	1600
9	720	840	960	1080	1200	1320	1440	1560	1680	1800
10	800	933	1067	1200	1333	1467	1600	1733	1867	2000
20	1600	1867	2133	2400	2667	2933	3200	3467	3733	4000
50	4000	4667	5333	6000	6667	7333	8000	8667	9333	10000
100	8000	9334	10667	12000	13333	14667	16000	17337	18667	20000

3×14 or 6×7.

Fractions over $\frac{1}{2}$ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	42	49	56	63	70	77	84	91	98	105
2	84	98	112	126	140	154	168	182	196	210
3	126	147	168	189	210	231	252	273	294	315
4	168	196	224	252	280	308	336	364	392	420
5	210	245	280	315	350	385	420	455	490	525
6	252	294	336	378	420	462	504	546	588	630
7	294	343	392	441	490	539	588	637	686	735
8	336	392	448	504	560	616	672	728	784	840
9	378	441	504	567	630	693	756	819	882	945
10	420	490	560	630	700	770	840	910	980	1050
20	840	980	1120	1260	1400	1540	1680	1820	1960	2100
50	2100	2450	2800	3150	3500	3850	4200	4550	4900	5250
100	4200	4900	5600	6300	7000	7700	8400	9100	9800	10500

7×20 and 10×14.

Fractions over $\frac{1}{2}$ added, others excluded.

No. Pieces	12	14	16	18	20	22	24	26	28	30
1	140	$163\frac{1}{3}$	$186\frac{2}{3}$	210	$233\frac{1}{3}$	$256\frac{2}{3}$	280	$303\frac{1}{3}$	$326\frac{2}{3}$	350
2	280	327	373	420	467	513	560	607	653	700
3	420	490	560	630	700	770	840	910	980	1050
4	560	653	747	840	933	1027	1120	1213	1307	1400
5	700	817	933	1050	1167	1283	1400	1517	1633	1750
6	840	980	1120	1260	1400	1540	1680	1820	1960	2100
7	980	1143	1307	1470	1633	1797	1960	2123	2287	2450
8	1120	1307	1493	1680	1867	2053	2240	2427	2613	2800
9	1260	1470	1680	1890	2100	2310	2520	2730	2940	3150
10	1400	1633	1867	2100	2333	2567	2800	3033	3267	3500
20	2800	3267	3733	4200	4667	5133	5600	6067	6533	7000
50	7000	8167	9333	10500	11667	12833	14000	15167	16333	17500
100	14000	16333	18667	21000	23333	25667	28000	30333	32667	35000

LAWS OF MECHANICS' LIENS.

ARKANSAS.

Digest of Statutes 1884. Section 4402, 4424.

Every mechanic, builder, artisan, laborer or other person, including contractors, sub-contractors and material furnishers, who shall perform any labor upon, or furnish any materials, machinery or fixtures for, any building, erection or other improvement upon land, by virtue of any contract, express or implied, with the owner thereof or his agent, trustee, contractor, or sub-contractor, shall have for his work done, or materials, etc., furnished, a lien upon such building, etc., and upon the land belonging to its owner, and upon which it stands.

A sub-contractor to obtain such lien shall, before he commences work or furnishes materials, give notice to the owner of his intention and the probable value of the work, etc., he will do. If after his contract is carried out he shall settle with the contractor in writing, and the settlement being certified by the contractor to be correct, the sub-contractor shall present it to the owner, etc., and within 60 days from the time his contract shall have been completed, the sub-contractor shall file with the clerk of the circuit court a copy of the settlement between him and the contractor; it shall be a lien upon the building, erection or improvement for which the things were furnished or the labor done. Then the employer shall become the surety of the contractor to the sub-contractor for the amount due for such service rendered.

Every person, except a sub-contractor, who wishes to avail himself of the advantages of lien shall within 90 days after the service has been rendered, file with the clerk of the circuit court a full statement of the amount due him, and a correct description of the property to be charged with said lien verified by affidavit.

Liens shall be paid *pro rata*, except that the lien of a sub-contractor shall be paid before that of a contractor. Land not exceeding two acres lying conveniently around said building shall be subject to the above lien. The sale of property charged with a lien shall not affect previous encumbrances duly recorded, or of which the lien holders had due notice. No lien shall be for a greater amount than that stipulated in the original contract.

Sub-contractors must bring suit within 6 months, and all others within 9 months from the time of filing account.

CONNECTICUT.

General Statutes, 1888. Ch. 186, Sections 3018, 3030.

Any person furnishing material or rendering services to an amount exceeding $25 in the construction or repair of any building or appurtenance may have a lien on such building and on the land on which it stands, such liens to take precedence of subsequent encumbrances; *provided*, that no such lien shall attach to any estate not owned by the party against whom such claim exists. A person wishing to obtain such lien shall file with the town clerk, within 60 days after services rendered, a certificate in writing, describing the premises, the amount of the claim and the date of the commencement.

No person other than the original contractor for the building, or a sub-contractor, whose contract with such original contractor is in writing, and has been assented to, in writing, by the other party to such original contract, shall be entitled to claim any such lien, unless he shall, within 60 days from the time he commenced to render the service, give written notice to the owner of the building, that he has so commenced to furnish materials, or render services, and intends to claim a lien therefor on said building. The aggregate of such liens shall not hold to a greater extent than the price which the owner agreed to pay for such building and appurtenances. Sub-contractors are paid *pro rata*, and have priority over the principal contractor. No mechanic's lien shall continue in force for more than two years, unless suit shall have been brought within that time.

There is a lien on vessels by virtue of materials furnished or service rendered exceeding $20 in amount. Liens for mariners' wages have preference.

ILLINOIS.

Revised Statutes 1887. Ch. 82, Sections 1 to 47.

Any person, who shall by contract, express or implied, with the owner of land, furnish labor or materials or services as an architect or superintendent in building, altering, repairing or ornamenting any building or appurtenances thereto, shall have a lien upon the land and upon such building and appurtenances for the amount due him for such labor, material or services.

When the contract is expressed no lien shall be created if the time stipulated for the completion of the work is beyond three years from its commencement. Where the contract is implied no lien shall be had unless the work shall be done or materials furnished within one year from the commencement of the work.

Every person wishing to avail himself of the provisions of this act

shall file with the clerk of the circuit court a statement of the account due him, and containing a correct description of the property to be charged with the lien, verified by affidavit. Any person having filed such a claim may bring suit at once to enforce the same.

Priority is given the lien on the building, etc., erected.

No creditor shall be allowed to enforce the lien to the prejudice of other creditors, encumbrancers or purchasers, unless his claim shall have been filed with the clerk within four months after the last payment shall have become due and payable. Suit must be commenced within two years after filing such claim.

Every sub-contractor, mechanic, workman or other person who shall in pursuance of the purposes of the original contract furnish any labor or materials is given a lien to the extent of the interest of the owner at the time of the making of the original contract. The aggregate of all liens shall not exceed the original contract price. Suit must be commenced to enforce the lien in behalf of sub-contractors, etc., within 3 months from the performance of the sub-contract. Such sub-contractors, etc., must serve a notice on the owner substantially in the following form:

To..... You are hereby notified that I have been employed by ..... to (here state whether to labor or furnish material, and substantially the nature of the undertaking or demand) upon your (here state the building and where situated, in general terms) and that I shall hold the (building, or as the case may be) and your interest in the grounds liable for the amount that (is or may become) due me on account thereof.

Date..... Signature.....

If the sub-contract is in writing a copy of it, if it can be obtained, must be served with such notice within forty days from the completion of such sub-contract or within forty days after payment should have been made. The owner may retain money to pay claims of which notice is given to him.

INDIANA.

From Revised Statutes of 1883, Ch. 115.

Persons performing labor or furnishing materials for the construction or repair of any building, may have a lien, separately or jointly, upon the building which they may have constructed or repaired, and on the interest of the owner in the lot or land on which it stands, to the extent of the value of the labor done, or materials furnished, or for both.

The provisions of this act shall extend to work done on any new

buliding; and to a contract entered into with the owner of any building for repairs, provided such are furnished with the consent of the owner of the land on which the building may be situated, but not to any contract made to the tenant, except only to the extent of his interest.

To acquire lien any person furnishing labor, etc., to contractor must notify owner or his agent before or at the time labor, etc., is furnished, that he is so doing, and any such persons wishing to obtain a mechanic's lien may give notice in writing to the owner of the amount of his claim, and what are the services for which his employer is indebted to him. The owner shall be liable for such claim, not to exceed the amount due or to become due from him to the employer, which claim may be recovered in an action whenever an amount equal to such claim over other claims having priority shall be due from such owner to the employer; and any sub contractor by giving notice as above of the amount of labor or materials he has engaged to furnish, shall have the same claim against the owner for service rendered after the notice is given, as is given above to mechanics, etc. Whenever action is brought against an owner, all sub-contractors, journeymen and laborers who have given due notice, as required, may become parties to such action, and, upon judgment, the amount collected shall be divided *pro rata*.

The person wishing to obtain such lien shall, also, file in the recorder's office, within 60 days after completion, whether his claim be due or not, notice of his intention to hold a lien, setting forth the amount claimed, and time when labor, etc., began to be furnished, and shall have precedence over all subsequent claims except other mechanic's and material-men's liens.

Any person having such lien may enforce it in the circuit court, or court of common pleas of the county in which the service was rendered, within one year from the completion of the work or expiration of credit if given. The court rendering judgment shall order the sale to be made, such sale to be without predjudice to the rights of any prior encumbrancer, owner or other persons not parties to the action.

All boats, vessels and water-craft of every description, found in waters of this state, including wharf-boats and floating warehouses, which are liable to be removed from place to place, are liable: 1.—For all debts contracted either within or without the state. 2.—For all damages arising from neglect of contract entered into in connection with the business of such boat, etc. 3.—For all injuries done to persons and property by such boat, etc., or by owners, officers or crew done in connection with the business of the same. Claims, if

growing out of the above causes, are liens upon the boat, etc. Among such liens, mariner's and boatmen's wages shall be preferred. (Act of March 29, 1879.)

In case of settlement by process of law of the business of any company, corporation, person or persons, debts owing to laborers or employes shall have preference to the extent of $50 for labor performed within six months next preceding such seizure, or if not enough to satisfy, they shall be paid *pro rata*.

Decisions, Etc.—The construction of a pavement abutting on a lot is not embraced in the mechanics' lien law. To make the property of a married woman subject to the mechanics' lien law, she must have done what would have made her personally liable as an unmarried woman. A prior mortgage, as also dower interest, is equivalent to a mechanics' lien.

A mechanics' lien can be enforced for work done and materials furnished in the erection of a schoolhouse, built by order and contract of a trustee. A lien on a boat cannot be lost by delay, if there was no opportunity to enforce it.

IOWA.

From McLain's Annotated Statutes. Revision of 1880. Page 596.

Every mechanic or other person who shall perform any labor on, or furnish any materials, machinery, or fixtures for, any building, erection or other improvement upon land (including those engaged in the construction or repair of any work of internal improvement) by virtue of any contract with the owner, his agent, trustee, contractor, or sub-contractor, shall have a lien upon such buildings, etc., and upon the land belonging to such owner upon which they may be situated, to secure payment for such labor done, or materials, etc., furnished. The entire land is subject to the above liens to the full extent of the owner's interest therein when such service was rendered for his benefit. When the owner of the building has only a lease-hold interest in the land, the forfeiture of such interest shall not impair the lien on the building, which may be sold to satisfy the same, and removed 30 days after the sale. When such service shall have been rendered in the construction, repair or equipment of any railroad, canal, viaduct, or other similar improvement, the lien shall extend to the erection, excavations, embankments, bridges, road-bed, and all lands upon which they may be situated, except the right of way, and these shall constitute the building, erection, or improvement mentioned in the statute.

Every person wishing to obtain such a lien shall file with the clerk

of the district court of the county in which the building, etc., may be situated a just and true statement of the amount due him, after allowing all credits, stating the time when such service was rendered, and when completed, and containing a correct description of the property to be charged with the lien, and verified by affidavit.

Such statement must be filed by a principal contractor within 90 days, and by a sub-contractor within 30 days, from the completion of the contract. Where the claim is upon a railroad, it may be filed within 60 days after the last day of the month in which the service was rendered. A failure to file the claim within the periods mentioned, shall not defeat the lien, except where it may concern purchasers and encumbrancers in good faith, without notice, whose rights accrued after the expiration of the required period, and before the claim was filed.

To preserve his lien as against the owner, and to prevent payments by the latter to the principal contractor, or to intermediate sub-contractors, the sub-contractor must, within the period mentioned in the preceding clause, serve a written notice, of the filing of such claim, on the owner, etc. When filed and served after the expiration of the 30 days, the lien shall be enforced only to the extent of the balance due from the owner to the principal contractor at the time of such service.

The mechanics' lien provided for in this statute shall take priority as follows: *First.*—As between themselves, in the order of filing the statement. *Second.*—They shall take priority to all garnishments made upon the owner for the contract debt. *Third.*—They shall have priority to all other subsequent liens and encumbrances, except as before given, when the statement is filed after the specified time. *Fourth.*—If there were previous encumbrances upon the land, such claims shall have preference as to the value of the land, while the lien provided for in this statute shall have preference as to the value of the improvement, if it be a new one. If the service rendered be for repairs, the prior encumbrance has preference as to the value of the property, before the repairs were begun, and the lien has preference as to the value of the repairs as compared to the previous value of the property. Where the improvement is a separate building that can be removed, it may be sold by order of court. If the premises must be sold as a whole, the court will adjust the several claims as above.

Upon the written demand of the owner, etc., the person claiming the lien shall commence suit, to enforce such lien, in the district or circuit court, within 30 days thereafter.

Definitions and Decisions.—All persons furnishing materials and

doing work as above, except those that have contracts directly with the owner, proprietor, agent or trustee, shall be considered sub-contractors. The contract need not be express, or in writing. A husband cannot act in regard to his wife's property without her consent. A lien attaches to the building and not to the material furnished. A person furnishing material under contract has a lien for all the material furnished, whether used or not. A laborer employed by a sub-contractor, when the latter has been paid in full by the contractor, cannot enforce a lien against the owner.

KANSAS.

Compiled Laws of 1885. Sections 4447–5454.

Any mechanic or other person who shall, under contract with the owner of any piece of land, his agent or trustee, or under contract with the husband or wife of such owner, perform labor or furnish material for erecting, altering or repairing any building or the appurtenances of any building, or any erection or improvement, or shall furnish or perform labor in putting up any fixtures, machinery or attachment in or to any such building, etc., or plant and grow any trees, vines, plants or hedge, or build a stone fence, or build or furnish material for a fence on any tract of land, shall have a lien upon such buildings, etc., and upon the whole tract of land, for the amount due him for such work done or material furnished. Such liens shall have precedence of all subsequent encumbrances.

To obtain a lien, as above, a material man or sub-contractor shall file a statement of the amount due, and the property upon which the work was done or material furnished, with the clerk of the district court, and a copy furnished to the owner of the premises within 60 days after the completion of the work or furnishing the materials, etc. An original contractor shall file the required statement as above, within four months from the time of completion, etc.

Action to enforce such lien must be brought in the district court of the county, within one year after completion of such work, etc., and if there are several lien-holders they shall all be made parties to the action, and if their claims cannot be paid in full, payment shall be made *pro rata.*

KENTUCKY.

General Statutes, 1883. Ch. 70, Sections 1–15.

A person who performs labor or furnishes material in the erection, altering or repairing of a house, building, or other structure, or for

any fixture or machinery therein, or for the improvement, in any manner, of real estate, by contract with, or by the written consent of the owner, shall have a lien thereon, and upon the land upon which such improvement may have been made, or on any interest such owner has in the same, to secure the amount thereof with costs. If the owner claims by executory contract, and if, for any cause, such contract shall be set aside, the lien shall follow the property into the hands of the person to whom the same may come, to the extent only that the actual value of the property may be enhanced by the improvements so placed upon it.

If an evicted owner or claimant shall be entitled to compensation for improvement, the rights of the lien-holder shall be substituted for those of the person so evicted. If improvements are made by contract with a lessee, and during the term of the lien, the lessee's interest shall return to the owner, and the owner shall refuse to accept such improvement, the lien-holder may remove the same, provided it can be done without injury to previous improvements.

If the work is done or materials furnished, not to the owner, but to a contractor or sub-contractor notice shall be given to the owner that a lien will be claimed. Then it shall be the duty of the owner to withhold a sufficient amount to satisfy the claim. If he shall fail so to do, the property shall be in lien; *provided*, that no lien shall exist in favor of such persons, in case the contractor himself is not entitled to a lien, nor if security shall have been taken for the labor performed or materials furnished.

The claimant within 60 days after the completion of the contract shall file with the clerk of the county court a full statement of account and description of the property intended to be covered in the lien. Actions to enforce such liens shall be brought within six months from the last named dates, except in case of the death of the defendant, when a further six months shall be allowed.

LOUISIANA.

R. Laws 1884, Sections 2876-2884.

Architects, undertakers, bricklayers, painters, master-builders, contractors, sub-contractors, journeymen, laborers, cartmen, and other workmen employed in constructing or repairing buildings, or making other works, and those who supplied the owner, or other person employed by the owner or his agent or sub-contractor, with materials of any kind for the construction or repair of an edifice o other work, which have been used in the erection or repair of such

houses or other work, shall have a lien on such buildings, etc., and upon the lot of ground not exceeding one acre, upon which the same shall be erected, provided the ground belongs to the person having such buildings, etc., erected.

To preserve the lien the contract, or a detailed statement of the amount due, verified under the oath of the party doing or having the work done, must be recorded with the register of privileges in the parish where the property is situated. The lien is valid against third persons from the date of such recording.

Every person doing any work on any building, etc., erected under contract between the owner and builder, may deliver to the owner an attested account of the amount and value of the work and labor performed and then unpaid; and the owner shall thereupon retain from the amount due the contractor for the benefit of such person, such amount due such person. If the contractor shall not within ten days after receipt from the owner of a copy of such claim, give notice that he intends to dispute the claim, he shall be considered as assenting to the demand, and the owner shall pay the same when it becomes due.

If the contractor shall dispute any such claim, the matter shall be submitted to three arbitrators, the decision of two of whom shall be final; and in case the contractor fails to pay within ten days after such decision, the owner is required to pay out of funds retained by him; and suit may be brought against him by such claimant in case of his failure to pay.

MAINE.

From Revised Statutes of 1883, Ch. 91, Sections 30-34.

A person who performs labor or furnishes materials in erecting or repairing any building, by virtue of an express or implied contract has a lien on such building, and whatever interest the owner of the building has in the land on which it stands. The claimant must, within 20 days after completing the contract, file a full sworn statement of account, with a description of the property, with the town clerk. Suit to enforce the lien must be begun within 90 days after the same time.

There is an elaborate lien against vessels to secure payment for work done on them or material furnished, but it is too lengthy to give here.

MASSACHUSETTS.

From the General Statutes 1882.

Any person to whom a debt is due for labor performed or material furnished, and used in the erection, alteration or repair of any building or other structure upon real estate, by virtue of an agreement with, or by consent of the owner thereof, or any person having authority from the owner, has a lien on the property and lands for his charges. Unless the labor or materials were performed or furnished by contract with the owner, he may prevent any lien from attaching, for work or materials not already performed or furnished, by giving written notice to the person performing the labor or furnishing the materials that he will not be responsible for the debt. Anyone having an interest in the property attached may release the same by giving sufficient bonds.

There shall be no lien for materials furnished unless the person furnishing same shall before so doing, give written notice to the owner that he intends to claim such lien.

Liens are dissolved, unless the claimant, within 30 days after ceasing to work, files in the registry of deeds for the county or district where the property is situated, a true statement of the account, together with a description of the property and the owner's name; and suit to enforce the lien must be begun within 90 days after ceasing to work or furnish materials.

MICHIGAN.

From Public Acts of 1887.

Every person who shall, in pursuance of a contract, expressed or implied—existing between himself, as contractor, and the owner, part owner, lessee, or person holding under any land contract or otherwise, any interest in real estate,—build, alter, improve, repair, erect, beautify or ornament, or who shall furnish any labor or materials for such purpose in or for any house, building, machinery, wharf or other structure, and every person who shall, as sub-contractor, laborer or material-men, perform or furnish to any such original or principal contractor, any labor or materials in carrying forward such contract, shall have a lien therefor upon such house, or other structure, and its appurtenances, and also upon the entire interest of such owner, etc., in the lot or piece of land upon which it may stand, said piece of land not to exceed one quarter-section, or if in an incorporated village or city, not to exceed the lot or lots upon which it may stand. The liability of the holder of the house

or lands shall not exceed his interest in the same at the time the contract was made, and the total amount of such liens shall not exceed the amount due, or to become due on such contract.

A lien holds if the service was performed upon the lands of a married woman by contract with her husband and *with her consent.*

Such lien shall not attach unless the contractor or otherwise, as the case may be, shall file within 60 days after completion of service in the office of the register of deeds of the county in which the lands, etc., are situated, a written notice, substantially in the following form:

To All Whom it May Concern: *Take Notice!*—That I intend to claim a lien upon the following premises, and the tenements and appurtenances thereon, for labor and materials furnished or to be furnished by me, as contractor (*or sub-contractor, or laborer, as the case may be*) under a certain contract existing between..... as owner (or otherwise), claiming an interest in said premises, and .....as contractor for.....(*building, repairing, putting in machinery or otherwise*), which premises are described as follows: (Giving the proper real estate description.)

[Signed],

.....,

Contractor (*or as the case may be.*)

A copy of which notice shall be served on the owner within 10 days after filing. The owner shall not be bound beyond the amount due at the time of filing and serving such notice, or which may thereafter become due.

The party filing such claim shall, whenever required by the owner, furnish a statement of work and materials furnished to date and still unpaid, and 30 days from completion of contract make affidavit of the amount actually due him over and above all credits, and file it in the same manner as the original claim, together with proof by affidavit of the due service of notice on the owner.

The several liens upon the same party, under the same contract shall be deemed simultaneous mortgages, and shall continue for 60 days and no longer after such affidavit is filed, unless proceedings are begun, as provided, to enforce them.

When the owner shall have failed to perform his part of the contract, and therefore the other party, without his fault, shall have been prevented from completely performing his part, he shall be entitled to pay for as much as he has done, in proportion to the price stipulated for the whole, and the court shall adjust his claim accordingly. When several lien-holders have equal rights as between themselves, payment shall be made *pro rata.*

MINNESOTA.

From Revision of 1878. Laws 1885, Laws 1887.

Whoever performs labor or furnishes materials or machinery for erecting, constructing, altering or repairing any house, mill, manufactory or other building or appurtenance, or for constructing, altering or repairing any boat, vessel or other water craft, by virtue of contract with the owner or agent thereof, shall have a lien to secure payment of the same upon such building, vessel, etc., together with the interest of the person owning such building to the land upon which it is situated, not exceeding 40 acres, and, if in a city, town or village plat, upon the lot upon which it is erected, not to exceed one acre.

Upon entering into a contract, to do labor or furnish materials, for which a lien might accrue, if the contractor shall enter into a bond with the owner guaranteeing the payment of all persons who may do work, etc., under the contract, said bond to be filed according to law, no lien shall attach in favor of the persons mentioned above.

To obtain such lien the person entitled shall, within 90 days of the time of performing the service, file in the office of the register of deeds a full statement of the account between himself and the person from whom the account is due, and shall bring suit within 4 months after such filing. When work is suspended without the consent of laborers and material-men, etc., they may proceed with it at their own cost, in accordance with the original contract, as far as may be necessary to prevent the work already done from going to waste.

Where lands or buildings cannot be sold, they may be leased to satisfy lien-holders. In case of settlement of business, the liens of employes for wages, not to exceed $200, shall have preference.

MISSISSIPPI.

R. Code 1880, Sections 1378—1392. Laws 1882, Ch. 88.

Debts contracted in the construction, etc., of any building, machinery, water-craft, embankments, railroads, etc., shall be a lien upon such building, etc., and the land covered thereby. Such lien shall only take effect as to purchasers and encumbrancers in good faith and for valuable consideration without notice from the time of filing the contract in the office of the chancery clerk of the county where the land is situated for record, or the commencement of a suit.

Where building or other improvement is erected in whole or in part by contract the lien shall be in favor of contractor alone.

Where contractor or master workman shall refuse to pay any person who may have furnished materials or labor used in the erection of such building, etc., such person may give notice in writing to the owner, and thereupon the amount due by the owner to the contractor or master builder shall be bound for the payment of the sum so claimed.

Where the amount exceeds $150, suit must be commenced in a circuit court of the county where the property is situated, within 6 months after the time that the money becomes due and payable.

MISSOURI.

From Revised Statutes of 1879. Acts 1885, p. 195.

Every mechanic or other person who shall perform any labor upon or furnish any materials, fixtures or machinery for any building, erection or improvements upon land, or for repairing the same, by virtue of any contract with the owner thereof, or his agent, trustee, or contractor, upon complying with the provisions of the statute, shall have, for his work done or materials, etc. furnished, a lien upon such building, etc., and upon the land belonging to such owner on which the same are situated to the extent of one acre, or if in a village or city, upon the lot or land on which the building, etc., is situated. A building erected on leased lots or land shall be held for the debt contracted in erecting the same, and also the leasehold term for such lots or land.

Every original contractor within six months, every journeyman and day laborer within 60 days, and every other person within four months after the indebtedness shall have accrued, shall file with the clerk of the circuit court a statement verified under oath of the demand due him, with a full description of the property upon which the lien is to apply. Such lien shall take precedence over all subsequent encumbrances. All actions shall be commenced within 90 days after filing the lien.

Ten days before the filing of such lien, notice of the same shall be given to the persons against whom the claim is brought. There shall be no preference among holders of liens for work done or material furnished as above.

Liens against a railroad shall be filed within 90 days after the completion of the work, and shall be on all the improvements and equipments of the railroad and on the right of way.

NEBRASKA.

Compiled Statutes of 1881. Laws 1885, 1887.

Any person who shall perform any labor or furnish any material, or machinery or fixtures for the erection, repairing or removal of any house, mill, manufactory, or building or appurtenance, by virtue of a contract expressed or implied with the owner thereof, or his agents, shall have a lien to secure payment of the same upon such house, mill, manufactory, building or appurtenance, and the lot of land upon which the same shall stand.

Any person furnishing labor or material as above to any contractor or sub-contractor, who shall wish to obtain a lien upon any of the structures mentioned above, may file a sworn statement of the amount due him or them from such contractor or sub-contractor, together with a description of the land upon which the same were done or used, within 60 days from the rendering of such service, with the register of deeds of the county, in which the land is situated, and, if the contractor does not pay him, he shall have a lien for the amount due on such lot or lots and the improvements thereon, from the same time and in the same manner as the original contractor.

To secure a lien as above the person furnishing labor or material shall file a sworn itemized statement of the work done or materials furnished within four months from the time of rendering the service, and it shall operate as a lien for two years from the rendering of such service.

If a promissory note has been taken, a lien may be obtained by filing the same in the office of the register of deeds with a sworn statement that the sum for which the note was given was due for service rendered as above.

Judgment may be obtained on a lien by civil action, and when suit is brought within the specified two years the lien shall continue until judgment is obtained.

Suspended work may be carried forward by the laborers, etc., engaged in the same, sufficiently to prevent the structure from going to waste.

If property cannot be sold because of defective title or non-residence of the owner it shall be leased for the benefit of lienholders.

Persons rendering service as above on any railroad, canal or similar work shall have a lien upon the entire improvements of the company or corporation, including their right of way.

NEW HAMPSHIRE.

From the General Laws, Edition of 1878. Page 334.

Any person who shall perform labor or furnish materials, to the amount of $15, or more, for erecting, altering, or repairing a house or other building or appurtenances, by virtue of a contract with the owner thereof, shall have a lien thereon and on any right of the owner to the land on which it stands; such lien to continue for 90 days after the completion of the contract, unless payment is previously made, and may be secured by an attachment thereon.

Persons rendering such services to a railroad shall have the same privileges. Any person rendering service by virtue of a contract with an agent, contractor or sub-contractor of the owner, may have the above lien by giving notice to the owner or person having charge of the property, that he intends to claim such lien.

NEW YORK.

Laws 1885, Ch. 342; Laws 1887, Ch. 420.

Any person who shall furnish any labor or materials in erecting or repairing any house or other building with the consent of the owner, may, upon filing the notice of lien prescribed, have a lien for the principal and interest of the price and value of such labor and material upon such house, etc., upon the land upon which the same may stand to the extent of the owner's interest at that time. The owner shall only be liable for the contract price or the amount remaining unpaid on the contract at the time of filing the lien or in case there is no contract, then the value of the labor and material remaining unpaid.

Notice of lien in writing may be filed in the clerk's office of the county where the property is situated at any time during the performance of the work or the furnishing of the materials, or within 90 days after the completion of the contract or final performance of the work. Such notice shall contain the names and residences of the claimants, the nature and amount of the labor and services performed or materials furnished or to be furnished, with the name of the owner or person in possession of the premises against whose interest a lien is claimed, the names of the persons ordering the work done, how much of the work has been done, and a description of the property to be charged. Such notice shall, within ten days after filing, be served on the owner or person in interest. No lien shall bind the property longer than one year, unless within that time action is commenced to enforce the same.

Sub contractors are entitled to priority of payment before original contractors. Workmen or laborers working for daily or weekly wages shall have preference over employers of labor.

OHIO.

From Revised Statutes of 1880. Laws 1887, P. 6, 46-51.

A person who performs labor, or furnishes machinery or material for constructing, altering or repairing a boat, vessel, or other water craft; or for erecting, altering, repairing or removing a house, mill, manufactory, or other building, appurtenance, fixture, bridge or other structure, under contract with owner, authorized agent, executor or administrator, shall have a lien to secure payment for same upon such vessel, bridge, etc., or upon such structure and upon the interest of owner in lot of land upon which it stands or to which it may be removed.

Such person to obtain such lien, shall, within four months from the time such service was rendered or such material furnished, file, with the recorder of the county in which such service was performed or material furnished, an affidavit containing an itemized statement of account between himself and the owner; also, a copy of the contract, if in writing—if not, a statement of verbal agreement; also description of lands on which such structure may stand or to which it may be removed. Shall operate as a lien from date of first item, and shall stand for two years from date of filing; or, if action is begun within that time, until the final adjudication thereof. There shall be no exemption against such lien. Sub-contractors, laborers, etc., may give to owner, within 60 days from the time of the completion of their labor, etc., statement of amount due them, and shall, at same time, file copy of statement in recorder's office.

A person who furnishes labor or materials upon any road, sidewalk, sewer, ditch, etc., by virtue of private contract with owner or agent of lands abutting, shall have a lien on such lands, to be obtained as above, but to stand for but one year. If several persons hold several liens, thus obtained, on the same job, they shall have no priority among themselves, but payment shall be made *pro rata*. If defective title prevents sale of lands to satisfy such lien, it shall be leased for benefit of lien-holders.

Sub-contractors, material-men, laborers, etc., may have lien upon payments due head contractors from owner, board, or public officer. Such lien shall be filed as above, and also with the owner, board, or public officer. Such claims of laborers, mechanics and material-men shall be paid before those of sub-contractors, and those of sub-con-

tractors before those of head-contractors. If owner or agent refuse to pay such claim, the holder shall have a lien upon the structure or upon the lands upon which it stands; such lien to have precedence over liens of head-contractors.

Definitions, Etc.—The term "owner" includes also the owner of a lease-hold. Material must be furnished for the particular structure. When contract is for an entire job at an entire price, no itemized account is necessary.

PENNSYLVANIA.

2 *Brightley's Purdon's Dig. 1883, Page 1157; Laws 1887, Page 413.*

Every building shall be subject to a lien for the payment of all debts contracted for work done or materials furnished for or about the erection or construction of the same, provided that no lien shall be allowed for less than $10; and for the payment of all debts not less than $20 contracted for work done or materials furnished for or about the repair, alteration of or addition to any building. To entitle any one to the benefits of this latter lien he shall give notice to the owner of the property, or his agent, at the time of furnishing the materials, etc., for such repairs, etc., of his intention to file a lien.

To determine the extent of the lien on the land, the owner thereof is required previous to the erection of any building, to declare and define in writing the boundaries of the land and cause the same to be entered in Mechanics Lien Docket kept by the Prothonotary. In default of so doing, the person having a lien may apply to the proper court to appoint persons to designate the boundaries.

Sub-contractors, mechanics and laborers are also entitled to a lien, but no material-man shall have the right to file a lien unless notice of the amount and character of his claim be given to the owner or his agent when the material is delivered on the premises or within ten days thereafter, and such sub-contractor, mechanic or laborer shall also file his claim within sixty days setting forth the nature of the work and when the same was done in the proper county. When mechanics liens are filed against the same property by the original contractor and a sub-contractor, mechanic or laborer the lien of the mechanic or laborer shall be first paid, but the owner is not liable for an amount greater than the amount named in the original contract.

Every person entitled to a lien shall file his statement of his demand in the office of the Prothonotary of the Court of Common Pleas of the county in which the building is situated. Every debt

shall be a lien until the expiration of six months after the work shall have been finished or materials furnished, though no claim shall have been filed; but the lien shall not continue longer than six months unless a claim be filed at or before the expiration of such time.

TENNESSEE.

Code 1884, Sections 2739-2750; Acts 1887, Ch. 85; Acts 1885, Ch. 8.

There shall be a lien upon any piece of ground upon which improvements are made by contract with the owner or agent, in favor of the person or persons doing the work or furnishing the materials on or for the same. If the property be mortgaged, and the holder of the mortgage shall give his consent to the improvements, the lien shall have priority over the mortgage. If the mortgagee fail to object within ten days after receiving notice, his consent shall be implied. A person shall have this lien, if at the time he begins to work, or to furnish material, he notifies the owner of his intention to rely upon a lien. The lien shall continue for one year from the completion of the contract, or until the decision of a suit that may be brought within that time.

Every person doing work or furnishing materials on the building for the original contractor shall have a lien if within 30 days after the building is completed, or contract shall expire, or be discharged, he notify, in writing, the owner or agent that the lien is claimed; and the lien continues for 90 days from such notice, and has precedence over all other liens from that time. A statement of the amount due for such work, etc., shall be filed with the county register.

TEXAS.

Revised Statutes 1879, Arts. 3164-3179; Laws 1885, Chap. 66.

Any person furnishing labor or materials, machinery, fixtures or tools to erect or repair any building, under or by virtue of any contract with the owner or his agent shall have a lien on such building, etc., and the land necessarily connected therewith, to secure the payment of such labor, etc.

To secure the lien original contractors must within four months, and other persons within 30 days, after the indebtedness has accrued, file his or their contract in the office of the county clerk of the County where the property is situated. Where such persons other than the contractor have no written contract it shall be sufficient for

them to file an itemized account of their claim, supported by affidavit that the account is just and correct. Where there is no written contract the person seeking to obtain the lien to file such sworn account which shall be recorded. Both contracts and accounts must be accompanied by description of the lands, etc., against which the lien is claimed. Where the land is in the country the lien, extends to and includes fifty acres upon which the improvements are situated. In a city or town it includes the lot or lots upon which the improvements are situated.

The lien attaches to the improvements on which the work was done in preference to prior liens or encumbrances on the land, and the person enforcing the lien may have the improvements sold separately.

Every person except the original contractor must give ten days' notice in writing to the owner that he holds a claim, stating the amount and from whom the debt is due; and the owner may retain the amount until the same is settled and determined to be due.

VERMONT.

From Revised Laws of 1880. Page 470.

Lien on Buildings:—When a contract is made, written or otherwise, for erecting, repairing, moving, or altering a building, or for furnishing labor or materials therefor, the person proceeding in pursuance of such contract or agreement, shall have a lien to secure the payment of the same upon such building, and the lot upon which the same stands. And such lien shall continue in force for three months from the time when payment becomes due. But no lien shall attach until the person claiming it shall file in the town clerk's office of the town where such real estate is situated, a written memorandum, asserting such claim. Such lien shall also apply to a water wheel or steam engine erected in or near a saw-mill, grist-mill or factory, to be used for the purpose of operating the machinery therein. Within three months from the time of filing such memorandum, if payment is due at that time, and, if not, three months after it becomes due, action may be begun thereon, and the said property may be attached.

These provisions shall apply to property held as a homestead. The real estate of a married woman may be charged with a lien when she assents to the contract.

Lien on Ships:—A person who performs labor or furnishes materials in building, repairing, fitting or furnishing a vessel, shall have a lien on the same for his wages or materials, until 8 months after

it is completed, and may secure the same by an attachment which shall have precedence of all other claims. But before such lien shall attach, such person shall demand payment of the owner or agent, and if payment of the just amount is tendered, the lien shall be discharged.

WEST VIRGINIA.

Code 1887. Ch. 75.

Every person doing work or furnishing materials on or for any building, by virtue of contract with the owner or his agent, or by agreement with the person holding such contract, shall have a lien upon the building and the land on which it is situated, not to exceed the contract price. Such liens shall have no priority among themselves, but shall be preferred to subsequent encumbrances.

To obtain such a lien, the claimant shall, within 60 days after he ceases to labor or furnish material, file with the clerk of the county court a sworn statement of the account and a description of the property. If a sub-contractor, he shall, within 30 days, serve notice on the owner of the amount of his demand, and that he intends to hold a lien against the owner's property. Suit to enforce such lien, must be brought within six months of the time of filing such claim, by filing a bill in chancery in the circuit court, in which all interested parties shall be made plaintiffs or defendants.

When the owner fails to perform his part of the contract, and the other party is therefore prevented from completing his part, the latter shall be entitled to compensation for as much as he has performed in proportion for the amount stipulated for the whole. Liens against corporations are for the same causes, and are enforced in the same manner as above.

WISCONSIN.

From Revision of 1878. Page 845. Supplement 1883. Ch. 143.

Every person who, as principal contractor, performs any labor, or furnishes any material for the erection, construction, repairs, protection or removal of any building, or of any machinery erected or constructed, so as to become a part of the freehold upon which it is situated, or of any bridge, or in the filling up of any water lot, or in the construction thereon of any wharf or permanent erection, or in digging or constructing any well or fountain, or in building or repairing any fences upon land, or doing manual labor thereon, shall

have a lien thereupon, and upon the interest of the owner of such building, etc., as above, in the land on which the same is situated, or of the person causing such manual labor to be done, not exceeding 40 acres, or if within the limits of any incorporated city or village, upon the piece of land used, or designed for use in connection with such building, etc., not exceeding one acre. Such lien shall be prior to any other lien which originates after the work has been begun.

Every person who, as sub-contractor of a principal contractor, performs any work for, or furnishes any material to, a principal contractor, in any of the cases mentioned above, shall have a lien, if, within 30 days after rendering such service, he shall give notice in writing to the owner of the property to be affected by it, setting forth that he has been employed by such principal contractor to furnish and has furnished such work, etc., with a statement of the items and the amount due therefor, and that he claims a lien; but the owner shall not be liable only so far as he is indebted to the principal contractor at the time of receiving the notice or thereafter. No sub-contractor of a sub-contractor has a lien. Liens under this statute are assignable, if notice is served on the owner within 15 days after assignment. The taking of a promissory note, or other evidence of indebtedness, shall not discharge the lien unless taken as payment, and so specified in the note, or otherwise.

Such lien shall not exist unless within six months from the date of the last charge for rendering such service, a claim for such lien which shall contain a statement of the demand, description of the property, etc., shall be filed in the office of the clerk of the circuit court of the county in which it was rendered, nor shall an action be maintained unless brought within one year from such date, unless within 30 days next preceding the expiration of one year, the person filing the lien shall make, and annex to the instrument on file, an affidavit setting forth the interest which he has by virtue of such lien in the property therein mentioned. The lien shall thereupon continue for another year. Any person having filed such claim may foreclose it in the circuit court, or other court having jurisdiction, and all such lien holders on the same job may be joined as plaintiffs. They shall have no priority among themselves.

THE LAW OF LOG LIENS.

MAINE.

A person who labors at cutting, hauling, rafting or driving logs or lumber, or at cooking for persons engaged in such labor, shall have a lien thereon for the amount due for his personal services, and the services performed by his team, which shall take precedence of all other claims, except liens reserved to the states of Maine and Massachusetts; to continue for 60 days after the logs or lumber arrive at the place of destination for sale or manufacture; and be enforced by attachment.

A lien on hemlock bark shall not continue after the bark reaches the market.

MICHIGAN.

Any person who performs any labor or services in cutting, skidding, felling, hauling, running, rafting, or booming any logs, timber, cedar-posts, telegraph poles, railroad ties, tan bark, shingle bolts, or staves, has a lien thereon for the amount due for such labor or services which shall take precedence of all other claims or liens thereon. The word "person" shall be interpreted to include cooks, blacksmiths, artisans and all others actually employed in performing such labor and services.

A statement in writing under oath must be filed in the office of the clerk of the county, setting forth the amount due and a description of the property, within 30 days from the completion of the labor and services. The lien is enforced by attachment.

Where such labor or services is performed between the 1st of October and the 1st of April, such statement shall be filed before the 1st of May thereafter, otherwise such statement shall be filed within 30 days after the completion of such labor or services.

Suit may be commenced to enforce such lien, if the same is due, immediately after the filing of the statement, and such claim shall cease to be a lien on the property named in the statement unless suit is brought within 3 months after such statement is made.

MINNESOTA.

Any person who may do or perform any manual labor in cutting, banking, driving, rafting, cribbing or stowing any logs, railroad cross-ties or timber shall have a lien thereon as against the owner thereof and all other persons except the State for the amount due for such services, and the same shall take precedence of all other claims thereon. Such lien cannot be waived by agreement, but any such agreement shall be wholly void. The claimant must file his statement under oath in the office of the surveyor general of the district, setting forth the date of commencement and termination of such labor, the amount due, and a description of the logs on which the lien is claimed. For labor performed between October 1st and April 1st, the statement must be filed before May 1st thereafter, and for labor performed in any other part of the year the statement must be filed within 30 days after completing the same. The lien is enforced by attachment. This act is intended only to protect laborers for hire, and not persons interested in contracting, cutting, hauling, banking or driving logs by the thousand.

NEW HAMPSHIRE.

Any person who shall perform labor or furnish supplies to the amount of $15 or more toward rafting, driving, cutting, hauling, or drawing wood, bark, lumber or logs, or at cooking or hauling supplies, in aid of such labor, shall have a lien thereon for such labor or supplies, which lien shall take precedence of all prior claims, except for public taxes, to continue 90 days after the contract is completed, and may be secured by attachment.

Any sub-contractor can secure the same by giving notice, in writing, to the owner of his intention.

VERMONT.

A person cutting or drawing logs shall have a lien thereon for his wages which shall take precedence of other claims except public taxes, and shall continue 60 days after the services are performed. But such lien shall not attach until the person claiming it files in the town clerk's office, or, if the town is not organized, in the county clerk's office, a brief statement of the contract and his purpose to enforce the lien.

Such lien shall have no validity against a subsequent purchaser, unless a suit is brought and the logs attached within 30 days from the time the plaintiff's right of action accrues; and shall have no validity against anyone unless suit is brought and the logs attached within 60 days from such time.

WISCONSIN.

Any person who shall perform any labor or services in cutting, felling, hauling, running, driving, rafting, booming, cribbing, towing, sawing or manufacturing into lumber any logs or timber in any of the counties of this state shall have a lien on such logs, etc., for the amount due or to become due for such labor or services, which shall take precedence of all other claims or liens thereon.

In the counties of Door, Florence, Kewaunee, Marathon, Langlade, Marinette, Oconto, Portage, Shawano, Taylor and Waupaca, any person furnishing any supplies in the cutting, felling, hauling, running, driving, rafting, booming, cribbing, towing, sawing or manufacturing into lumber any logs or timber, or any person furnishing any supplies or doing or performing any labor or services in cutting, felling, piling, handling or hauling cordwood and in cutting, etc., railroad ties, tan and other barks, piling, telegraph poles, telephone poles or fence posts, shall have a lien thereon for the amount due or to become due for such supplies, labor or services. A claim in writing for such demand, verified under oath, shall be filed in the office of the clerk of the circuit court. If supplies are furnished and services rendered between November 1st and May 1st, such claim shall be filed before the 1st of June, otherwise such claim shall be filed within 30 days after the last day of furnishing such supplies or performing such labor or services.

MISCELLANEOUS INFORMATION.

SEASONING AND SHRINKING OF TIMBER.

Were the properties of timber investigated with the same care and research bestowed upon metals it would be found that there is even a greater variation in them. A majority of the varieties of wood owe their commercial value to two particular characteristics: beauty of grain and susceptibility to polish.

The strength of a piece of timber depends upon the part of the tree from which it is taken. Up to a certain age, the heart of the tree is best; after that period, it begins to fail gradually. The ash, beech, elm and fir are generally considered at their best when of from 70 to 80 years growth, and the oak is seldom at its best in less than 100 years, much, however, depending on surrounding circumstances. As a rule, trees should not be cut before arriving at maturity, because there then is too much sap-wood, which is the worst part, being softer and more liable to decay.

The strength of many woods is nearly doubled by the process of seasoning; hence timber used in its green state is not only weak, but is exposed to continual change of bulk, form and stability. Wood will always warp after a fresh surface has been exposed, and will change its form by the presence of moisture. The effect of moisture on dry wood is to cause the tubular fibers to swell; hence if a board be wet upon one side, the fibers there will be distended, and it will bend. The natural law that governs the shrinkage or contraction of timber is most important to practical men, but is too often overlooked. The amount of the shrinkage of timber in length, when seasoning, is so inconsiderable that it may in practice be disregarded (except in the redwood of the Pacific slope, which is said to shrink only in length), but the shrinkage in transverse directions is much greater, and presents some peculiarities which can only be explained by examining the structure of the wood as resulting from its mode of growth.

An examination of the end section of any exogenous tree, such as beech or oak, will show the general arrangement of its structure. It consists of a mass of longitudinal fibrous tubes, arranged in irregular circles, which are bound together by means of radial plates or rays, which have been variously named; they are the "silver grain" of the carpenter, or the

"medullary rays" of the botanist, and are in reality the same as the pith. The radial direction of these plates or rays and the longitudinal disposition of the woody fiber must be considered in order to understand the action of seasoning; for the lateral contraction or collapsing of the longitudinal fibrous or tubular part of the structure cannot take place without first tearing the medullary rays, hence the shrinking of the wooden bundles finds relief by splitting the timber in radial lines from the center, parallel with the medullary rays, thereby enabling the tree to maintain its full diameter. If the entire mass of tubular fiber composing the tree were to contract bodily, then the medullary rays would, of necessity, have to be crushed in the radial direction to enable it to take place, and the timber would thus be as much injured in proportion as would be the case in crushing the wood in a longitudinal direction.

If an oak or beech tree is cut into four quarters, by passing the saw twice through the center at right angles, before the splitting and contracting has commenced, the lines forming the angle of each quarter will be

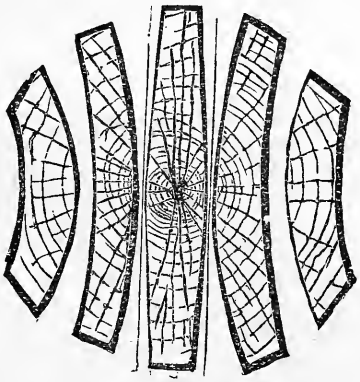


FIG. 1.

of the same length and at right angles to each other, or in techical language, square; but after storage in a dry place for a year, a great change will be found to have taken place, both in the form and in the dimensions of the pieces. The lines upon the two flat surfaces will still be of the same length as before, but the exterior diameter of the quarter circle will have contracted very considerably, and the two face lines will not be at right angles to each other, by reason of the collapsing of the vertical fibers, while the medullary rays will have been brought closer.

Supposing the log to be sawed into five pieces of plank, let us consider the action of the various pieces as shown in the diagram Fig. 1. After seasoning and contracting, it will be found that the middle of the center

plank still retains the original thickness, from the resistance of the medullary rays, while the thickness will be gradually reduced toward the edges, for want of support, and the entire breadth of the plank will be the same as it was at first. If, then, we take the planks at each side of the center, by the same law, their change and behavior will be quite different. They will still retain their original thickness in the center, but will be a little reduced on each edge throughout. But the side next to the heart of the tree will be pulled round or bent convex, while the outside will be the reverse, or hollow, and the plank will be considerably narrower throughout its entire length, more especially on the surface of the hollow side. Selecting the next two planks, they will be found to have lost none of their thickness at the center, and very little of their thickness at the edges, but very much of their breadth, and will be curved round on the heart side and made hollow on the outside. Suppose some of these planks to be cut into square prisms when in the green state; the shape that these prisms will assume after a period of seasoning will entirely depend upon the part of the tree to which they belonged, the greatest alteration being perpendicular to the medullary rays. Then, if the square was originally near the outside, as shown by the black border lines in Fig. 2.

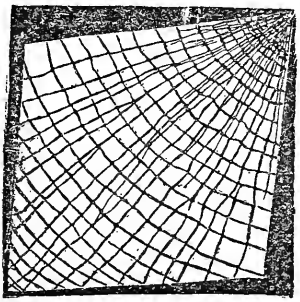


FIG. 2.

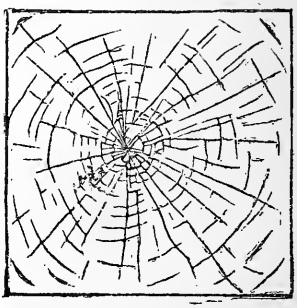


FIG. 3.

the effect will be a contraction, as shown by the inside lines. After a year or two the square end of the prism will become rhomboidal. By understanding this natural law, it is comparatively easy to predict the future behavior of a board or plank, by carefully examining the end wood, in order to ascertain the part of the log from which it has been cut, as shown by the angle of the ring growths and the medullary rays.

If the stick of sawed timber be cut so as to leave the heart in or near the center, it will season square in form, but the end will show a fracture of the medullary rays, commonly spoken of as season-checking, as illustrated in Fig. 3. Here the contrast between the rhomboidal seasoning of

the stick sawed from the outside diameter of a log, and that in which the heart is left, is made quite plain. All sawyers who have been puzzled with the warping of logs upon the mill carriage will in this severance of the medullary rays find an explanation of the phenomenon, which is less marked in soft timber than in the closer grain of southern and norway pine, or of oak, beech and other hardwoods.

QUARTER AND BASTARD SAWING.

Quarter-sawing and rift-sawing are the same. To secure the minimum of shrinkage or warp, a board must be rift-sawed, which means cutting the medullary rays at right angles with the circles of growth. Quartered oak is simply rift-sawed, the designation "quartered" arising from the common method of first cutting the log into quarters, and then cutting the quarters as shown in Fig. 1 of the following diagrams. The lines

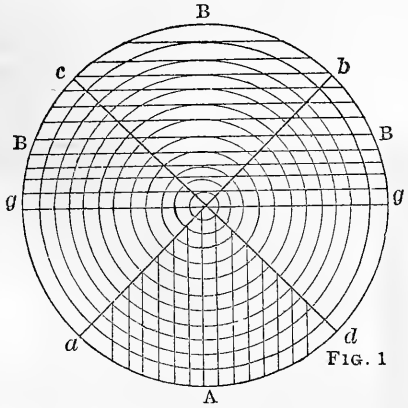


FIG. 1

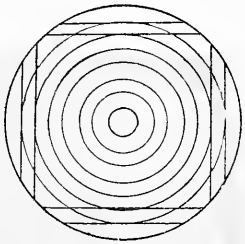


FIG. 2

a, *b*, *c*, *d* are those upon which the log is supposed to be quartered. The circles represent the concentric rings of the tree's growth. The straight lines across the upper half of the log, **B**, show the ordinary method of slicing it up into boards with a circular or gang. Wherever the cut of the saw crosses the circles at right angles, or nearly so, that much of the board is rift-sawed; when it runs nearly parallel with them it exposes the grain, and is what is rather inelegantly termed bastard. The board nearest the middle, *g g*, will be almost a perfectly rift-cut piece, while the fourth one from it toward the outside will be just about half rift and half bastard. Supposing the lower quarter A to be cut out from the log, the common and most simple method of quarter-sawing it is to make the cuts, as shown by the straight lines which cross the concentric

rings at sufficiently near right angles for making good flooring. Each piece, however, will have a bevel edge as shown, which must, of course, be squared by the edger. Special arrangements of mill carriage and head blocks are in use for rift-sawing when great accuracy is desired.

The method of bastard-sawing is illustrated in Fig. 2. It simply consists of so turning the log upon the carriage as to expose the grain as much as possible. The diagram only shows cuts that would make an ordinary cant of the piece, but the judgment of the sawyer must be exercised to so turn the log as will make its form square, octagon or hectagon, as may be best to expose instead of cut across the grain, and allow its curve to show in the center of the board. Both of these methods of sawing, as will be seen, are wasteful to the timber, a matter that cannot well be avoided. Judicious bastard-sawing in certain kinds of wood, such

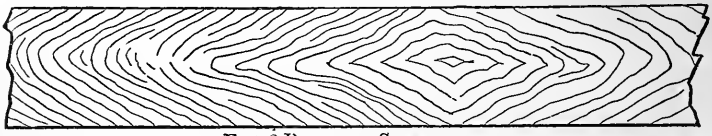


FIG. 3 BASTARD SAWED

FIG. 4 RIFT SAWED

as oak or ash, develops some very beautiful grain effects, and for ornamental finishing purposes enhances the value of the wood to as great, or even a greater degree than by rift-sawing it, as the latter is mainly required where the stuff is to withstand continuous wear, as in the case of flooring, or is to fill a place where it must neither shrink nor warp, as in the case of sounding or reed boards in musical instruments. The appearance of pieces of lumber cut rift and bastard may be seen in Figures 3 and 4. If laid in a floor Fig. 3 will wear rapidly and unevenly, and always have a tendency to sliver, while Fig. 4 having the ends of the grain exposed to receive the wear, will greatly outlast it, wear more evenly and present a much better appearance. On the other hand as the panel to a desk or other piece of furniture, Fig. 3 would be much more handsome than the other.

The methods of quarter-sawing, adopted and championed by experienced sawyers, are numerous, but the following are some of the most approved plans. It should be remembered that the variety of timber and also the purpose for which the product is to be used determines what is and what is not practical and practicable quarter-sawing. In

oak and similar woods, where it is desired to show as much as possible the typical figure produced by quarter-sawing, the line of sawing should be almost directly between the heart and the outside of the log. The same is necessary where the purpose is to avoid warping, as in material for wide panels, table tops, etc. The difficulty in this method of cutting is that almost every piece has a beveled edge and has to be run through an edger. The product is also of all widths.

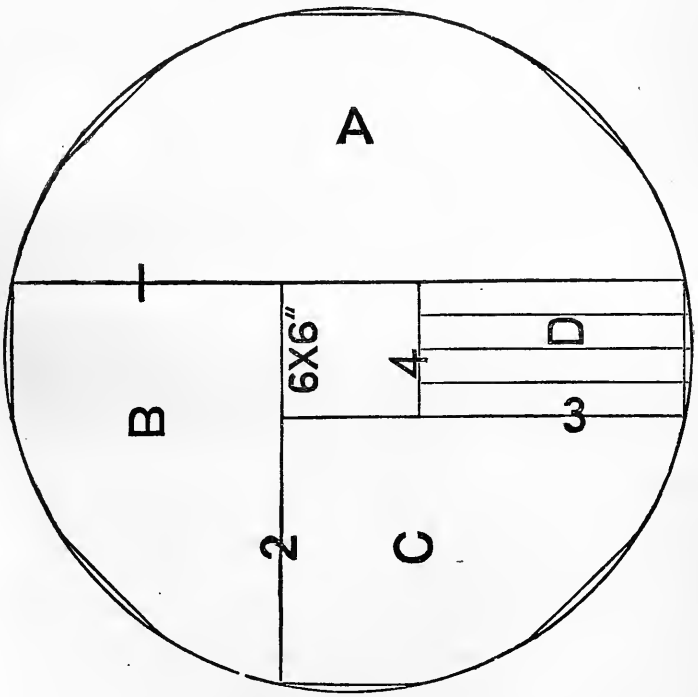


FIG. 5.

Where, however, mere resistance to wear is required, without regard to beauty of grain, and also where the piece is to be securely fastened in place, much less attention need be paid to an exact rift-sawing. In flooring, for example, it is sufficient if the annual layers of growth be cut across at an angle of, say, 45 degrees, or even less. Thus the cant need be turned much less frequently on the carriage than when genuine quarter-sawing is required.

One of the most popular methods of rift-sawing in hardwoods is as follows: Halve the log, put one-half back on the log deck and place the other with the half-round on the carriage and against the knees with the sawed surface sloping down from the top of the knees toward the saw at an angle of 45 degrees. Cut off boards until the heart is reached, when turn down the side against the knees until the last surface cut is at an angle of 45 degrees, and cut as before. Turn down again in the same direction another eighth turn, and repeat. Thus each half of the log takes four positions. This method requires for its most convenient application an under dog, but good work is often done by the careful use of a wedge under the log. In this method the whole log is reduced to lumber which is all pretty close to the true rift-sawed, but the waste in edging is great.

In the method illustrated by the diagrams, Figs. 5, 6, and 7, the whole contents of the log is more nearly utilized. The larger diagram shows the preliminary work. The two smaller ones show how the different parts are to be treated. The different steps are as follows: First, take off eight slabs, reducing the log to an octagon. Second, cut on the lines 1,

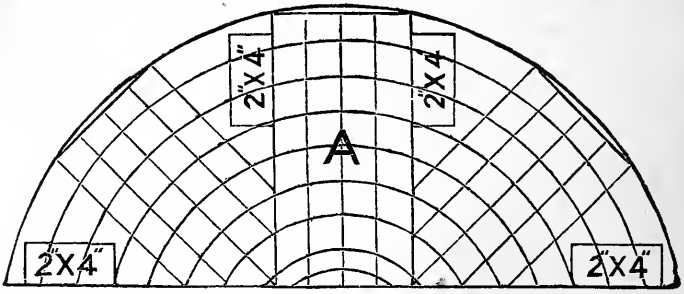


FIG. 6.

2, 3 and 4 in the order given, leaving a heart piece which may be 6×6, as shown in the first diagram, or 4×4. Third, cut the piece D as shown. Fourth, cut the piece A as shown in the second diagram. This piece, somewhat less than one-half the log, requires three turnings. Fifth, saw the parts B and C, which are alike in size and shape, as indicated by the lines in diagram, Figure 7. It will be observed that the wedge-shaped pieces may be converted into 2 x 4's, or larger.

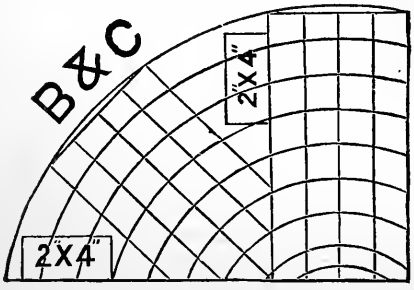


FIG. 7.

Until recently too little attention has been paid to quarter-sawing yellow and norway pine flooring, but as an exact quartering is not necessary, the process is comparatively simple and inexpensive. The Barney & Smith Manufacturing Company, of Dayton, Ohio, who also furnished the preceding plan, recommends the method illustrated by the engraving Figure 8.

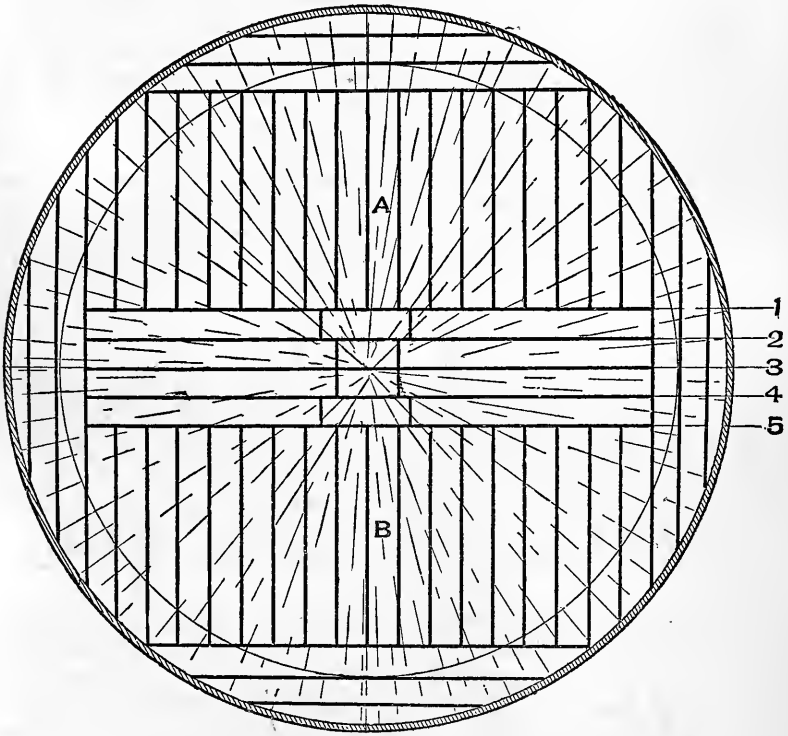


FIG. 8.

First, square the log, eight inch face heart. Then saw lines 1, 2, 3, 4 and 5, after which rip up the cants A and B together. This plan is particularly adapted to gang mills. All the lumber inside the circle indicating the heart wood is near enough a true quarter-sawing for flooring.

A modification of this design is shown in Figure 9, the only difference being that a square piece is left inclosing the heart.

Either of the methods outlined in Figs. 8 and 9 is, as stated above, especially adapted to mills using gangs. If two gangs are in use, part of the saws can be taken out of one of them, leaving blades at the center and sides of the frame, to cut in Fig. 8, the numbered lines and those parallel to them. Then the cants A and B may be sent to the second gang to be ripped up together. In mills where there is no gang the two large cants produced by either method may be placed on the carriage, the one on top of the other, and sawed together.

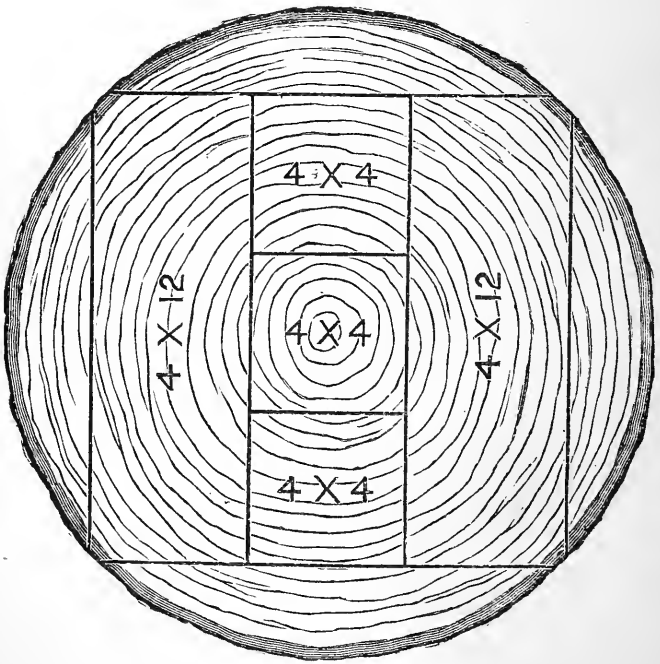


FIG. 9.

It is but recently that gang saw mills have been put at work in the yellow pine mills of the south. For the most part, quarter-sawed yellow pine flooring—which is the only kind especially valuable—has been obtained by sorting from the regular run of the strips. That process leaves the balance and the major portion of the stock of comparatively little value. It is auspicious that now, in 1889, so many southern mills are equipped with especial reference to producing quarter-sawed yellow pine flooring.

CAPACITY OF CISTERNS.

To find the capacity of a cylindrical cistern or other vessel in gallons and barrels (such a vessel has a circle for its bottom and has perpendicular sides)—Multiply the square of the diameter by the depth (all in feet), and multiply the product by 5.875+ for gallons or by .1865 for barrels. These results are correct within within a very small fraction.

Table of capacity for each 6 inches in depth of cisterns from 6 inches to 25 feet in diameter in standard gallons of 231 cubic inches and barrels:

DIAMETER.	GALLONS.	BARRELS.	DIAMETER.	GALLONS.	BARRELS.
6 in.	.7344	.023	12 ft. 6 in.	457.7489	14.589
8 in.	1.3056	.041	13 ft.	496.4532	15.766
9 in.	1.6524	.052	13 ft. 6 in.	535 3763	17.002
10 i	2.0800	.065	14 ft.	575.7682	18.285
12 in.	2.9376	.093	14 ft. 6 in.	617.6289	19.615
1 ft. 6 in.	6.6096	.210	15 ft.	660.9584	20.990
2 ft.	11.7500	.373	15 ft. 6 in.	705.7567	22.413
2 ft. 6 in.	18.3599	.583	16 ft.	752.0238	23.882
3 ft.	26.4383	.839	16 ft. 6 in.	799.7597	25.398
3 ft. 6 in.	35.9855	1.143	17 ft.	848.9644	26.960
4 ft.	47.0015	1.492	17 ft. 6 in.	899.6378	28.570
4 ft. 6 in.	59.4862	1.889	18 ft.	951.7801	30.226
5 ft.	73.4398	2.332	18 ft. 6 in.	1005.3912	31.929
5 ft. 6 in.	88.8622	2.822	19 ft.	1060.4711	33.677
6 ft.	105.7533	3 358	19 ft. 6 in.	1117.0197	35.473
6 ft. 6 in.	124.1133	3.941	20 ft.	1175.0372	37.316
7 ft.	143.9420	4.571	20 ft. 6 in.	1234.5235	39.205
7 ft. 6 in.	165 2396	5.247	21 ft.	1295.8785	41.141
8 ft.	188.0060	5.971	21 ft. 6 in.	1357.9024	43.123
8 ft. 6 in.	212.2411	6.740	22 ft.	1421.7950	45.152
9 ft.	237.9450	7.556	22 ft. 6 in.	1487.2827	47.228
9 ft. 6 in.	265.1178	8.419	23 ft.	1553.9867	49.250
10 ft.	293.7593	9.329	23 ft. 6 in.	1622.2857	51.519
10 ft. 6 in.	323.9696	10.285	24 ft.	1692.0536	53.735
11 ft.	355.4487	11.288	24 ft. 6 in.	1763.2902	56.184
11 ft. 6 in.	388.4966	12.338	25 ft.	1830.9956	58.356
12 ft.	423.0134	13.434			

To find, by means of the above table, the capacity of a cylindrical cistern—Multiply the number in the table opposite the given diameter by the number of times 6 inches is contained in the given depth.

EXAMPLE:—Find the number of gallons contained in a tank 18 feet in diameter and 15½ feet deep. By the table the capacity of a vessel 18 feet in diameter and 6 inches deep is 951.7801 gallons, 6 inches is contained in 15½ feet 31 times, 951.7801×31=29505.1831 the number of gallons. The above table will give results correct to thousandths of gallons and hundredths of barrels.

MEASURES OF SURFACE.

Table of Ordinary Units.

144 sq. in.=1 sq. ft.
30¼ sq. yds.=1 sq. rod.
640 acres=1 sq. mile or section.
9 sq. ft.=1 sq. yd.
160 sq. rods=1 acre.
36 sections=1 township.

Comparative Table.

SQ. MI.		ACRES.		SQ. RODS.		SQ. YDS.		SQ. FT.		SQ. IN.
1	=	640	=	102,400	=	3,097,600	=	27,878,400	=	4,014,489,600
		1	=	160	=	4,840	=	43,560	=	6,272,640
				1	=	30¼	=	272¼	=	39,204
						1	=	9	=	1,296
								1	=	144

Surveyors use the following table in measuring land:

625 sq. links make 1 pole.
16 poles make 1 sq. chain.
10 sq. chains make 1 acre.
640 acres make 1 sq. chain.
36 sq. miles (6 miles sq.) township.

Comparative Table.

TP.		SQ. MILES.		ACRES.		SQ. CHAINS.		POLES.		SQ. LINKS.
1	=	36	=	23,040	=	230,400	=	3,686,400	=	2,340,000,000
		1	=	640	=	6,400	=	102,400	=	6,400,000
				1	=	10	=	160	=	100,000
						1	=	16	=	10,000
								1	=	625

The square foot is used in estimating glazing, stone-cutting, etc.; the square yard in plastering, roofing, paving, etc.; the acre in measuring land.

Solid or Cubic Measure.

1728 cu. inches make one cu. foot.
27 cubic feet make one cubic yard.
46,656 cu. inches make one cu. yard.
40 cu. ft. of round timber=1 ton.
42 cu. ft. of shipping timber=1 ton.
50 cu. ft. of hewed timber=1 ton.
128 cu. ft.=1 cord.

Timber in one load—English.

50 cu. ft of square timber.
109 lin. ft. of 6x12 in. "
200 " of 6x6 "
150 " 4 in. planking 12 in. wide.
200 lin. ft. 3 in. planking 12 in. wide.
300 " 2 in. " "
400 " 1½ in. " "
600 " 1 in. " "

Liquid Measure.

The United States standard for measurement of all liquids is the "wine" or "Winchester" gallon containing 231 cubic inches.

4 gills make one pint.
2 pints " quart.
4 quarts " gallon.
31½ gallons make one barrel.
2 barrels " hogshead.

Dry Measure.

The Government standard of dry measure of the United States is the "Winchester Bushel" so called, being a cylindrical vessel having an inside

diameter of 18½ inches, and a depth of 8 inches, and containing 2150.42 cubic inches.

4 gills make one pint.	8 quarts make one peck.
2 pints " quart	4 pecks " bushel.

Measures of Weight.

The Pound is the United States standard of weight as applied to general purposes, and is the weight of 27.7015 cubic inches of distilled water, at its greatest density (*i. e.* at 39° 83" Fahrenheit, the barometer being at 30 inches), and is equivalent to 7,000 Troy grains.

27 11-32 grains make one dram.	25 pounds make one quarter.
16 drams " ounce.	4 quarters make one cwt.
16 ounces " pound.	20 cwt. " ton.

(In some cases the following table for gross weight is used: 28 lb. =1 quar.; 4 quar.=1 cwt.; 20 cwt., or 2240 lbs.=1 ton.)

Comparative Table of Weights.

	Troy.	Apothecaries.	Avoirdupois.
1 pound	equals 5,760 grains.	equals 5,760 grains.	equals 7,000 grains.
1 ounce	" 480 "	" 480 "	" 437.5 "
	175 pounds	" 175 pounds	" 144 pounds.

The half peck, or dry gallon, contains 268.8 cubic inches. Six quarts, dry measure, are equal to nearly 7 quarts liquid measure.

Measures of Capacity.

The following table will often be found convenient, taking inside dimensions:

A box 24 in. x 24 in. x 14.7 will contain a barrel of 31½ gallons.
A box 15 in. x 14 in. x 11 in. will contain 10 gallons.
A box 8¼ in. x 7 in. x 4 in. will contain a gallon.
A box 4 in. x 4 in x 3.6 in. will contain a quart.
A box 24 in. x 28 in. x 16 in. will contain 5 bushels.
A box 16 in. x 12 in. x 11.2 in. will contain a bushel.
A box 12 in. x 11.2 in. x 8 in. will contain a half bushel.
A box 7 in. x 6 4 in. x 12 in. will contain a peck.
A box 8.4 in. x 8 in. x 4 in. will contain a half peck, or 4 dry quarts.
A box 6 in. x 5 3.5 in., and 4 in. deep, will contain a half gallon.
A box 4 in. x 4 in., and 2 1.10 deep, will contain a pint.

Hay Measure.—About 500 cubic feet of well-settled hay, or about 700 of new mown hay, will make a ton. To estimate amount of hay in mow —Ten cubic yards of meadow hay weigh a ton. When the hay is taken out of old stacks, 8 or 9 yards will make a ton. Eleven or 12 cubic yards of clover, when dry, weigh a ton. (*Note*—The only accurate method to measure hay is to weigh it, since two quantities equal in bulk will never weigh alike. Any rule is simply an approximation.)

Floor, Wall and Roof Measure.—To find the number of square yards in a floor or wall: Rule—Multiply the length by the width or height (in feet), and divide the product by 9; the result will be square yards.

Number of Trees Required per Acre.

4	feet	apart	each way	2,720	15	feet apart	each way 200
5	"	"	"	1,742	18	" "	" 135
6	"	"	"	1,200	20	" "	" 110
8	"	"	"	680	25	" "	" 70
10	"	"	"	430	30	" "	" 50
12	"	"	"	325	33	" "	" 40

Dimensions of One Acre.

A square, whose sides are 12,649 rods, or 69.57 yards, or 208.71 feet long, contains one acre. Table of dimensions of rectangle containing one acre:

RODS.

1	× 160	1½	× 106⅔	2	× 80	2	× 80
3	× 53⅓	3½	× 45 5-7	4	× 40	4½	× 35 5-9
5	× 32	5½	× 29 1-11	6	× 26⅔	6½	× 24 8-13
7	× 22 6-7	7½	× 21⅓	8	× 20	8½	× 18 14-17
9	× 17 7-9	9½	× 16 16-19	10	× 16	10½	× 19 5-21
11	× 14 6-11	11½	× 13 21-33	12	× 13⅓	12½	× 12 4-5
						12 13-2	× 12 13-20

Estimates of Materials.

3½ barrels of lime will do 100 square yards plastering, two coats.
2 " " " 100 " " one coat.
1½ bushels of hair " 100 " "
1¼ yards good sand " 100 " "
⅓ barrel of plaster (stucco), will hard-finish 100 square yards plastering.
1 barrel of lime will lay 1,000 brick. (It takes good lime to do it.)
2 " " 1 cord rubble stone.
½ " " 1 perch " (Estimating ¼ c'd to perch.)
To every barrel of lime estimate about ⅝ yards of good sand for plastering and brick work.

Rules Relating to Hydraulic Prime Movers.

Rule I. To calculate the *gross power* of a fall of water: To the actual head, add the height due to the velocity of water in the head-race. Multiply the sum by the volume of the flow of the water per second, and by the weight of water (62.4 lbs. per cu. ft.) The product will be the gross power in foot-lbs. per second. This divided by 550 equals the gross horse-power.

Rule II. To find the *net power* of a fall of water. Multiply the gross power by the probable efficiency of the prime mover to be used. That efficiency ranges in

Water pressure engines from	.65 to .75
Overshot and breast wheels	.70 to .80
Undershot wheels	.40 to .60
Turbine wheels	.60 to .80

To find the height of fall corresponding to a given velocity: Divide the half-square of the velocity by 32.2 (g).

Amount of Paint Required for a Given Surface.

It is impossible to give a rule that will apply in all cases, as the amount varies with the kind and thickness of the paint, the kind of wood or other material to which it is applied, the age of the surface, etc. The following

is an approximate rule: Divide the number of square feet of surface by 200. The result will be the number of gallons of liquid paint required to give two coats; or divide by 18 and the result will be the number of pounds of pure ground white lead required to give three coats.

CIRCLES.

Table showing the circumferences and areas of circles with diameters from 1 to 50 with sides of equal squares:

DIAMETER.	CIRCUMFERENCE.	AREA.	SIDE OF EQUAL SQUARE.	DIAMETER.	CIRCUMFERENCE.	AREA.	SIDE OF EQUAL SQUARE.
1.	3.141	.7856	.886	22.	69.11	380.13	19.496
1.5	4.712	1.797	1 329	23.	72.25	415.47	20.383
2.	6.283	3 141	1.772	24.	75 39	452.39	21.269
2.5	7 854	4.908	2.215	25.	78.54	490.87	22.125
3.	9.424	7.068	2.658	26	81.68	530.93	23.041
3.5	10.99	9.621	3.101	27.	84.82	572 55	23.928
4.	12.56	12.566	3 544	28.	87.96	615.75	24.814
4.5	14.13	15.904	3 988	29.	91.10	660.52	25.700
5.	15.70	19.635	4.431	30.	94.24	706.86	26.586
5.5	17.27	23.758	4.874	31.	97.38	754.76	27.473
6.	18 84	28.274	5 317	32.	100 5	804.24	28.359
6 5	20.42	33.183	5.760	33.	103.6	855.30	29.245
7.	21.99	38.484	6.203	34.	106.8	907 92	30.131
7 5	23.56	44 178	6 646	35.	109 9	962.11	31.017
8.	25 13	50.265	7.089	36.	113 0	1017.8	31.904
8.5	26.70	56.745	7.532	37.	116.2	1075.2	32.790
9.	28 27	63.617	7.976	38.	119 3	1134.1	33.676
9.5	29.84	70.882	8.419	39.	122.5	1194.5	34.562
10.	31.41	78.539	8.862	40.	125 6	1256.6	35.449
11.	34 55	95.033	9 748	41.	128.8	1320.2	36.335
12.	37 69	113.09	15.634	42.	131.9	1385.4	39.221
13.	40.84	132.73	11.520	43.	135.0	1452.2	38.107
14.	43 98	153 93	12.407	44.	138.2	1520.5	38.993
15.	47.12	176.71	13.293	45.	141 3	1590.4	39.880
16.	50.26	201 06	14.179	46.	144.5	1661.9	40.766
17.	53.40	226 98	15.065	47.	147.6	1734 9	41.652
18.	56.54	254.46	15.952	48.	150.7	1809.5	42.538
19.	59.69	283.52	16.838	49.	153.9	1885.7	43.425
20.	62.83	314.16	17.724	50.	157.0	1963.5	44.311
21.	65.97	346 36	18 610				

The circumference of a circle is the diameter multiplied by 3.1415926+ and the area is equal to the circumference multiplied by one-quarter the diameter; or, is equal to the diameter multiplied by .7854. These decimals being too extended for common use, the above table is an approximate one, correct as far as the decimals are carried.

Southwestern Pine Inspection.

RULES FOR GRADING, CLASSIFICATION AND GAUGES OF YELLOW PINE, AS ADOPTED BY THE SOUTHWESTERN LUMBER MANUFACTURERS' ASSOCIATION, FEB. 28, 1888.

FLOORING, 10, 12, 14 AND 16 FEET.

First and Second Clear flooring shall be well manufactured, and free of knots and other defects. Bright sap is admissible.

Star admits of three sound knots of ½ inch diameter, or of one of one inch, or of slight sap stains; but not more than three defects to be in any one piece.

No. 1 Common admits of sap stains and sound knots. No board will be admitted in this grade which will not lay without waste.

No. 2 Common admits of more defects, but no board shall be included in this grade which will not lay with a waste of one-quarter of the piece.

Rift-sawed flooring admits not to exceed three sound knots not over ½ inch in diameter, and the angle of the grain must not exceed 45 degrees.

BOARDS, 12, 14 AND 16 FEET.

First and Second Clear finishing and step plank shall not be less than 8 inches wide, and up to 10 inches shall be free of all defects. Widths over 10 inches and up to 12 inches may have one sound knot ¾ inch in diameter or knots equal to this on one face. Over 12 to 14 inches may have two such knots and three such knots over 14 inches. Bright sap is admissible. The above specifications shall apply to the face side of the board.

Star Finish shall not be less than 8 inches in width and shall admit of sap stains and of three sound knots equivalent to 3 inches in diameter, and on face side.

First Common admits of sound knots without regard to size or number, but shall be free from wane or splits that would materially injure the board.

No. 2 Common shall consist of lumber not as good as first common, but admits of no board that cannot be used with a waste of one-fourth.

FENCING.

No. 1 Common fencing shall be well manufactured, and 4 and 6 inches wide and admits of sound knots that do not materially impair the strength of the piece.

No. 2 FENCING consists of lumber not as good as first common, that can be used without a waste of more than one-quarter.

DIMENSION.

Piece stuff and small timbers shall be well manufactured, with not less than three square edges, free of unsound knots; seasoning checks and shakes admissible to one-eighth the length of the piece. Timbers of 10x10 and over may have a 2-inch wane on one corner, or its equivalent if on two or more corners, one-fourth of the length of the piece.

SIZES.

The standard thickness of inch flooring shall be 13-16 inch; of 1¼ inch flooring shall be 1 1-16 inch; of 5-8 ceiling, 9-16; of ½ ceiling, 7-16; of 3-8 ceiling, 5-16.

The standard width of 4 inch shall be 3⅛ inch face; of 6 inch, 5⅛ inch. Sized dimension shall be worked ⅜ inch off thickness and edge off 2x4; 2x6 and over to be worked ⅜ inch off thickness and ½ inch off edge; 4x4 and 4x6, one side and one edge, ⅜ off; 4x4 and 4x6, four sides ½ inch off.

Inch boards are finished, surfaced one or two sides to 13-16; 1¼ inch boards surfaced one or two sides, 1 1-16 inch; 1½ inch boards surfaced one or two sides, 1 5-16 inch.

WEIGHT.

	POUNDS.
Flooring 13-16 inch, " 1 1-16 " " 1 5-16 "	2,300
Ceiling, ⅜ inch	1,000
" ½ "	1,300
" ⅝ "	1,600
" ¾ "	2,000
Rev. Siding from inch stock	1,000
" " 1¼ inch stock	1,500
Drop siding 13-16x6 "	2,300
Molded Casings and Base	2,300
Finishing	2,800
Common Boards and Fencing, S 1 or 2 S	2,800
" " Rough	3,200
2x4, 2x6, 2x8, S 1 S and 1 E	2,500
" " Rough	3,200
2x10 and 2x12, S 1 S and 1 E	2,800
" " Rough	3,400
4x4 and 4x6, S 1 S and 1 E	3,000
" " Rough	3,800
6x6, 6x8 and 8x8 S 1 S and 1 E	3,600
" " Rough	4,000
8x10 and over "	4,000

GAUGES.

In the standard thickness of 13-16 flooring, the groove shall be located 7-32 from the bottom, the opening to be 9-32, leaving 5-16 above the groove to face the board. The tongue shall be located 7-32 from the bottom, be 4-16 thick, leaving a shoulder 11-32 above the tongue. Depth of groove ⅜ inch, and length of tongue 5-16. In 1⅛ inch, 1 inch, or ⅞ inch flooring the tongue and groove shall be located same distance from the bottom as in 13-16 inch.

1¼ flooring shall be dressed to 1 1-16 inch instead of 1⅛ inch.

The Shimer matching is adopted for ⅜, ½ and ⅝ ceiling in regard to location of tongue and groove.

YOU SHOULD

KEEP POSTED

WHETHER YOU ARE A

LUMBER OR LUMBER MANUFACTURER MERCHANT,

WHETHER you saw hardwood or pine, whether you own a planing mill or manufacture sash, doors and blinds, if you are not a proprietor, but desire to achieve success in your trade or profession, whether you are in the North, South, East or West, you

CANNOT KNOW TOO MUCH

about the lumber business in its general scope, as well as in its details of more particular concern to you.

Ignorance is not bliss in the lumber business, except for the other fellow. As to

GET AND KEEP POSTED

is a necessary condition of your success, and as

EXPERIENCE IS A DEAR TEACHER

you should, for economy's sake, invest $4 in a year's subscription to the journal which covers the lumber field and is the *vade-mecum* to success in it. In short

YOU SHOULD READ THE LUMBERMAN

TO those who have an appreciation of what the LUMBERMAN is, such an admonition is unnecessary; but it may be that you have never had an opportunity of carefully examining it, and so we would like briefly to tell you what it is.

It is a weekly journal of 52 to 68 pages, which in each issue covers practically the entire field of lumber manufacturing and trade in America. Of its large number of pages, 20 to 25 are occupied by fresh, original editorial matter, every line of which should be read by every lumberman who wishes to keep abreast of the times. It has in its service over sixty paid correspondents, representing nearly every important manufacturing point and market of the continent. This, with its large editorial force, enables it to furnish only the cream of its special information.

A high-class, high-toned, high-priced journal—it commends itself to the intelligent consideration of business men. Its success, past and present, has been based upon its independent and straightforward course on all matters of interest to the trade. It has made for itself readers, and the fact that it has readers has made its advertising of value.

In short, if you are a lumberman you should read it, if you wish to make customers of lumbermen in any branch of the trade you should advertise in it. If you have already followed this advice you know that what is said above about the merits of the LUMBERMAN is not exaggeration. If perhaps you have not, try it, and know by experience its value.

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Their Opinion, Based on Experience, is of Value.

E. P. ALLIS & CO., MILWAUKEE.

We consider the NORTHWESTERN LUMBERMAN one of the best mediums for advertising that we know of, as it reaches directly the **Lumber** trade, and we have shown our appreciation of it by carrying a full page advertisement in it for some years, and know that it richly repays us. E. P. ALLIS & CO.

RUSSEL WHEEL & FOUNDRY CO., DETROIT.

We are surprised at the circulation of your paper. Inquiries are coming to us from nearly every State in the Union, and some of them mean business. RUSSEL WHEEL & FOUNDRY CO.

KEYSTONE LUMBER & IMPROVEMENT CO., BOGUE CHITTO, MISS.

It is the only good advertising medium to reach the lumbermen of the country. I derive more information from one ad. in it than from any ten ads. I ever inserted in lumber or machinery line. It is a good recommend when your advertiser says, as I had to to you: "Take it out —give me a rest on mail matter." GEO. S. LACY.

WM. ULRICH, MILL FOREMAN.

I have secured a good position through my ad. in the NORTHWESTERN LUMBERMAN, and could have a dozen more if I wished. Have been obliged to answer a great many "already engaged." I have had more than the worth of my money, and any further insertion would be a burden to me in answering letters. After this, when I wish to advertise anything connected with sawmills or lumber, I will know where to go, and shall advise all others to go to the same place—the NORTHWESTERN LUMBERMAN. I commence work next week in Mississippi.
WM. ULRICH.

FROM A CHICAGO REAL ESTATE DEALER.

I have found the "For Sale" department of the LUMBERMAN an exceedingly satisfactory medium for placing the timber lands I have for sale before the capitalists of the lumber trade.
EDWARD P. SHELDON, 88 and 90 Washington St.

ATLANTA LUMBER COMPANY, ATLANTA, GA.

ATLANTA, GA., 1888—"We wrote you, August 7, to take out our ad., 'Sawyer and Filer wanted,' as we had employed the man. We are deluged with letters, and again insist on taking out the ad. or we will send you all the replies, so that you may answer them, and will send them to you by express, *collect*." ATLANTA LUMBER CO.,
M. F. AMOROUS, G. M.

After all, the value of the advertising of the LUMBERMAN is most conclusively demonstrated by observing the fact that those who have once given it a fair trial, thereafter are always its patrons whenever they have anything to present to any part of the Lumber trade of the country.

· If You Want ·

To buy or sell **anything** in the Lumber Trade—If you want to buy or sell timber lands or lumber, saw mills or planing mills; if you want to buy or sell second-hand machinery; if you want employment in any capacity, or if you want an employé, make the fact known through the Department of the LUMBERMAN headed "**Wanted**" and "**For Sale,**" and you will be almost certain to accomplish your object. Remember that the LUMBERMAN goes everywhere, is read by all classes, and that it has become a very popular medium of exchange among its 25,000 or more readers, and everybody consults it every week to see what is wanted or what is for sale.

CHEAPEST ADVERTISING IN THE WORLD
CONSIDERING RESULTS OBTAINED.

Some people, unused to this kind of advertising, may think the prices high, but it should be borne in mind that advertising of any kind is cheap or dear precisely in the ratio of results obtained. That which brings no results is dear at any price, but of what consequence is a dollar or two if the advertisement brings you what you want?

This argument will surely impress you favorably if you will think it over a moment.

RESULTS ARE WHAT YOU WANT.

NORTHWESTERN
Lumberman
CHICAGO.

NET CASH PRICES

IN THE "WANTED" AND "FOR SALE" DEPARTMENT:

For one insertion .. .. 25 cents per line,
For two consecutive insertions .. .. 40 " " "
For four consecutive insertions .. .. 60 " " "
For one year, 52 insertions .. .. $7.20 " " "

Payments MUST BE MADE in advance.

DIRECTIONS

For Estimating and Preparing Advertisements for this Department.

Ten words of ordinary length make one line.
Heading counts as two lines.
Only one heading line can be allowed.
No display except the heading can be admitted.
No advertisement of less than four lines received.

EXAMPLES

Of such advertisements as the LUMBERMAN can print in its "Wanted" and "For Sale" Department, with measure and cost of each:

WANTED—POPLAR AND WALNUT

ALL GRADES AND THICKNESSES.
WALLACE D. STAIRCASE, 518 999th st., New York.

Four lines; $1 for one week, $1.60 for two weeks, $2.40 for four weeks.

WANTED—BOOKKEEPER

BY A LUMBER MANUFACTURER; PREFER ONE HAVING SOME knowledge of the lumber business. Address
"EASTERN LUMBER," care NORTHWESTERN LUMBERMAN.

Five lines; $1.25 for one week, $2 for two weeks, $3 for four weeks.

FOR SALE—LOGGING ROAD EQUIPMENT

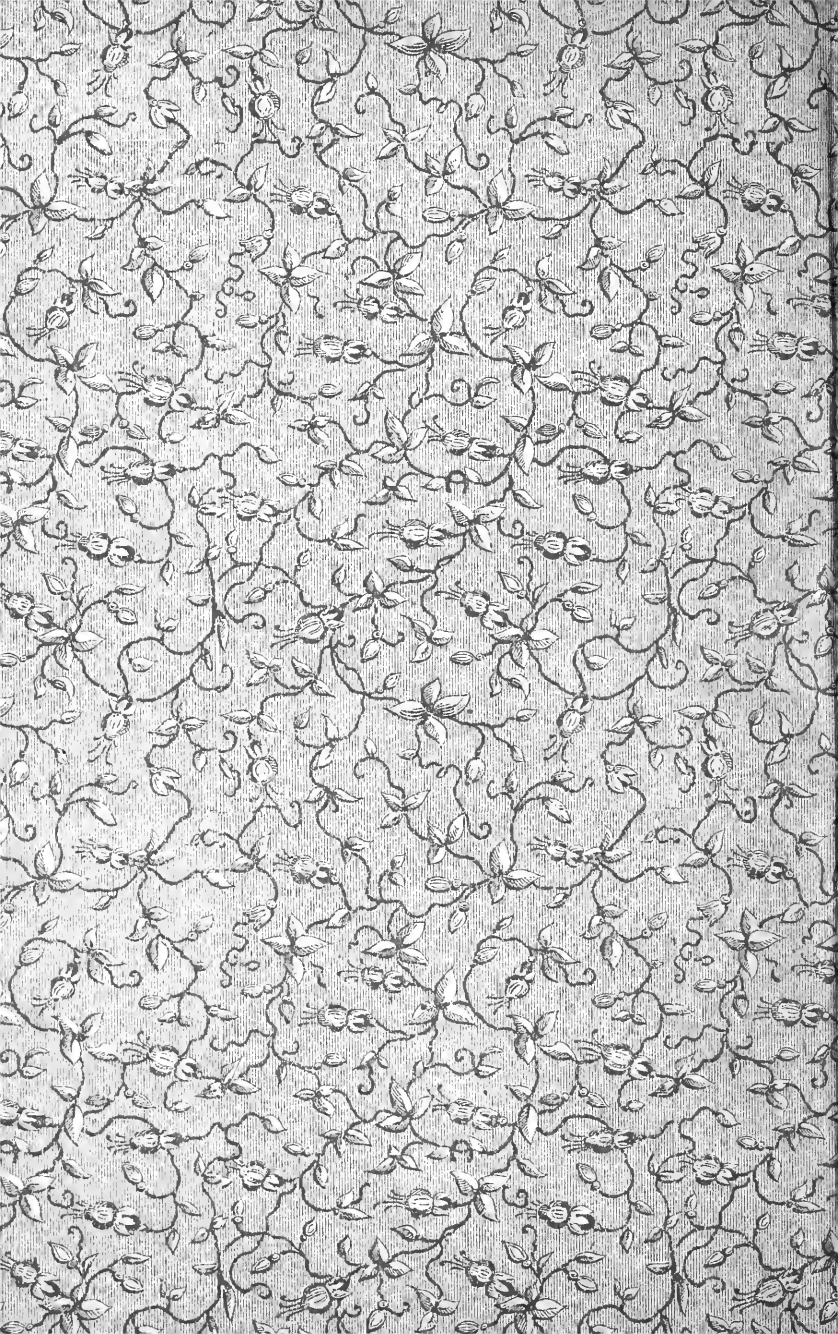
LIGHT STEEL RAILS (ALL WEIGHTS) WITH SPIKES, SPLICES AND switches. Also light locomotives and cars for logging roads. Correspondence solicited.
STEEL & CARMAN, Hamilton Building, Ironburgh, Pa.

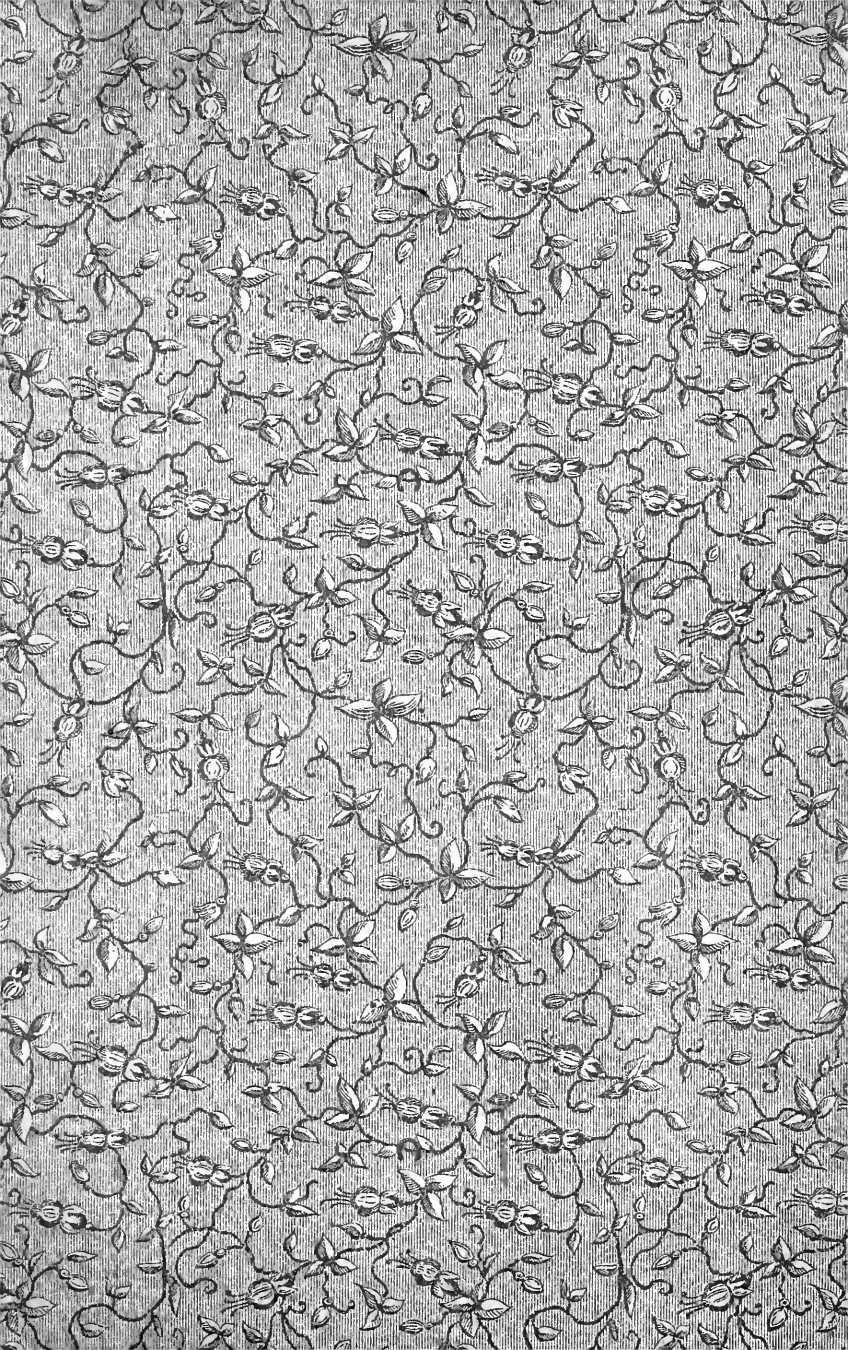
Six lines; $1.50 for one week, $2.40 for two and $3.60 for four weeks.

FOR SALE—SECOND-HAND MACHINERY

1 8-in. 4 sided Grant matcher.
1 Hoyt No. 2 double surfacer.
1 W. R. & R. double surfacer.
Also a large lot sash and door machinery. Send for full list to
THE FASTERLY MACHINE WORKS CO.,
38 and 40 Machinery St., Windtown.

Eight lines; $2 for one week, $3.20 for two and $4.80 for four weeks.





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